

**APPENDIX F**  
**ENVIRONMENTAL ASSESSMENT**

National Park Service  
U.S. Department of the Interior

Lake Meredith National Recreation Area  
Alibates Flint Quarries National

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# Environmental Assessment

**Proposal by Pioneer Natural Resources, Incorporated to  
Continue Operation and Maintenance of 45 Gas Wells;  
Associated Pipelines and Access Roads; Re-Entry of 22 Existing  
Natural Gas Wells; and, Drilling of an Additional Well  
Within Lake Meredith National Recreation Area  
Moore, Potter, and Hutchinson Counties, Texas**

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**Lake Meredith National Recreation Area  
January 2004**

**Environmental Assessment**  
**Proposal by Pioneer Natural Resources, Incorporated to**  
**Continue Operation and Maintenance of 45 Gas Wells and Associated Pipelines and Access**  
**Roads, Re-Entry 22 Existing Natural Gas Wells and Drilling of an Additional Well**  
**Within Lake Meredith National Recreation Area**  
**Moore, Potter, and Hutchinson Counties, Texas**  
**January 2004**

## **SUMMARY**

On May 15, 2003, Pioneer Natural Resources, Inc. (Pioneer) submitted a Plan of Operations to the National Park Service (NPS) to: (1) continue operation and maintenance of its 45 existing gas wells and associated pipelines and access roads, (2) re-enter 22 of 45 of its existing natural gas wells using single or dual laterals, and (3) drill one new vertical well (Bivins H-2) and re-enter the well at a later date.

This Environmental Assessment (EA) evaluates two alternatives. Alternative A evaluates baseline conditions under No Action. Under No Action, no wells would be re-entered and no new wells would be drilled, resulting in no new impacts. However, continuing operation and maintenance of 45 existing gas wells, and associated pipelines and access roads would result in the continuation of localized, short to long-term, negligible to moderate, adverse impacts on geology and soil resources, floodplains, vegetation, wildlife, and visitor use and experience. Continuing production of 45 wells would result in a negligible, beneficial impact on domestic energy supplies. There could be a moderate to major adverse impact on Pioneer due to the cost of preparing a plan of operations and not being able to further develop its private mineral interest.

Alternative B, Proposed Action, evaluates the Plan of Operations as submitted by Pioneer to re-enter 22 existing wells, and drill and re-enter one additional well, in addition to continuing operation and maintenance of 45 gas wells and associated pipelines and access roads. Due to the application of additional mitigation measures, there would be greater assurance that park resources and values would be protected; and at the completion of operations, for successful reclamation. Under Alternative B, there would be localized, short to long-term, negligible to minor, adverse impacts on park resources and values. There would be a negligible, beneficial impact on domestic energy supplies, and a minor to major beneficial impact on Pioneer Natural Resources should the new operations successfully produce hydrocarbons. Alternative B is the NPS preferred alternative. Alternative A is the environmentally preferred alternative.

## **PUBLIC COMMENT**

If you wish to comment on the Plan, EA, and draft Floodplain Statement of Findings, you may mail comments to the name and address below. A notice of availability will be published in the *Federal Register*, and in the local newspapers (Amarillo and Borger). The 30-day public review period will begin on the date the notice of availability is published in the *Federal Register*. Please note that names and addresses of people who comment become part of the public record. **If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.** However, we will not consider anonymous comments. We will make all submissions from organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

Superintendent Karren Brown  
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Alibates Flint Quarries National Monument  
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## **1.0 PURPOSE AND NEED**

### **1.1. INTRODUCTION**

Pioneer Natural Resources (Pioneer) proposes to continue to operate and maintain 45 gas wells, including re-entering 22 of the 45 wells, and to drill one new well and re-enter the new well at a later date. The continuation of existing operations would directly occupy 110.27 acres, while proposed new operations would directly occupy an additional 9 acres within Lake Meredith National Recreation Area. The new operations would require the issuance of new permits from the Railroad Commission of Texas, thereby triggering Pioneer to obtain a permit from the NPS. The Nonfederal Oil and Gas Rights Regulations, 36 CFR 9B, provide the regulatory framework for NPS to issue permits for nonfederal oil and gas operations that require access on, across, or through federally controlled lands or waters.

Pioneer submitted a Plan of Operations to the NPS on May 15, 2003, based on Alternative B identified in this EA. The NPS has determined that a Plan of Operations must be approved before any drilling activities may occur across the park boundary. The NPS also determined that an EA must be prepared and approved as part of this permitting process to determine the need for an Environmental Impact Statement (EIS) or whether a Finding of No Significant Impact (FONSI) can be issued.

### **1.2. PURPOSE AND NEED**

The purpose of this EA is to describe and evaluate a reasonable range of alternatives describing how the National Park Service (NPS) would permit Pioneer to continue operation and maintenance of 45 gas wells and associated pipelines and access roads, re-enter (drill single or dual laterals from existing well bores) 22 existing natural gas wells, and drill one new gas well (Bivins H-2) at a new location and re-enter the new well at a later date, while protecting and preventing an impairment to park resources and values, visitor use and experience, and human health and safety. This EA also provides information relating to the request for an exemption to drill the new well (Bivins H-2) within the 300-foot setback within the Dolomite Caprock formation Special Management Area (SMA).

When Congress authorized the construction of Sanford Dam in the early 1960s, the U.S. Government acquired surface ownership within the area. Private entities or the State of Texas retained the subsurface mineral interests on these lands. Thus, the federal government does not own any of the subsurface oil and gas rights in the park. However, the NPS is required by its laws, policies, and regulations to protect the park from any actions, including oil and gas operations that may adversely impact or impair park resources and values. Currently, there are 173 active nonfederal oil and gas operations within Lake Meredith National Recreation Area, which comprises 44,977.63 acres.

On May 15, 2003, Pioneer submitted to Lake Meredith National Recreation Area a Plan of Operations for continued operation of 45 natural gas wells and associated pipelines and access roads, re-enter 22 of the 45 existing wells, drill 1 new gas well and enter the new well at a later date. The NPS must decide whether to approve the plan and if additional mitigation measures are needed.

The analysis area in this EA for evaluating direct and indirect impacts includes:

- The direct area of impact for each park resource or value includes the existing 45 natural gas wells and their associated pipelines and access roads; the expansion of 22 re-entry wells up to 1 acre, and the one new well on 1 acre.
- The indirect area of impact for each park resource or value could vary for each impact topic, but generally would not extend more than 1,500 feet beyond wells. NPS has selected the 1500-foot analysis area because this is the distance required for elevated noise that occurs during the drilling of wells to attenuate to background levels. The analysis area along access roads and pipelines would include a 100-foot offset.
- For the impact topic, “Nonfederal Oil and Gas Development,” the analysis area includes: 1) the effect on Pioneer and mineral owners to meet NPS permitting requirements (including cost and time involved for Pioneer to prepare a Plan of Operations and contractor efforts, increased mitigation measures and reclamation requirements inside an NPS unit, and the effect of proceeding or not with new operations), and the effect on the domestic energy supply.

The analysis area for evaluating cumulative impacts on park resources and values includes the entire park, and for nonfederal oil and gas includes the effect on Pioneer and mineral owners to meet NPS permitting requirements, and the effect on the domestic energy supply.

### **1.3. OBJECTIVES OF TAKING ACTION**

The three objectives developed for this project of this EA are as follows:

- Provide Pioneer, as a holder of nonfederal oil and gas mineral interests, reasonable access for exploration and development.
- Avoid or minimize impacts on park values resources and values, visitor use and experience, and human health and safety.
- Protect and prevent impairment of park resources and values.

### **1.4. SPECIAL MANDATES AND DIRECTION**

The NPS evaluates project-specific proposals for oil and gas production and transportation on a case-by-case basis by applying a variety of Current Legal and Policy Requirements (CLPR) prior to issuing a permit under the general regulatory framework of the NPS’s Nonfederal Oil and Gas Rights Regulations (36 CFR 9B). The following discussion summarizes the basic management direction the NPS follows for permitting nonfederal oil and gas operations in units of the National Park System.

#### **1.4.1. NPS Organic Act and General Authorities Act-Prevention of Impairment**

The NPS Organic Act (16 U.S.C. § 1 et seq.) provides the fundamental management direction for all units of the National Park System. Section 1 of the Organic Act states, in pertinent part, that the NPS shall:

*“...promote and regulate the use of the Federal areas known as national parks, monuments, and reservations...by such means and measure as conform to the fundamental purpose of said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and*

*historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."*

The National Park System General Authorities Act of 1970 (16 U.S.C. § 1a-1 et seq.) affirms that while all national park system units remain "distinct in character," they are "united through their interrelated purposes and resources into one national park system as cumulative expressions of a single national heritage." The act makes it clear that the NPS Organic Act and other protective mandates apply equally to all units of the system. Further, amendments state that NPS management of park units should not "derogate the purposes and values for which these various areas have been established."

Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts. Congress has given the NPS the discretion to allow certain impacts in park units, but said that discretion is limited by the NPS's obligation to leave park resources and values unimpaired. Section 1.4.5 of the NPS Management Policies states that an impact would be more likely to constitute an impairment to the extent it affects a resource or value whose conservation is:

- (1) necessary to fulfill a specific purpose identified in the establishing legislation or proclamation of the park;
- (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- (3) identified as a goal in the park's general management plan or other relevant NPS planning documents.

These authorities all prohibit an impairment of park resources and values. Not all impacts are impairments. An impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be less likely to constitute impairment to the extent that it is an unavoidable result, which cannot be reasonably further mitigated, of an action necessary to preserve or restore the integrity of park resources or values.

Section 1.4.5 of the NPS Management Policies use the terms "resources and values" to mean the tangible and intangible attributes for which the parks are established and are being managed, including the Organic Act's fundamental purposes, and any additional purposes as stated in a park's establishing legislation. Park resources and values identified in NPS Management Policies as subject to the no impairment standard include the biological and physical processes which created the park and that continue to act upon it; scenic features; natural visibility; natural soundscapes and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures and objects; museum collections; and native plants and animals.

The NPS also includes the park's role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system among the values that

are subject to the no impairment standard. Finally, unless the activity is required by statute, NPS cannot allow an activity in a park if it would involve or result in:

- 1) inconsistency with the park's enabling legislation or proclamation, or derogation of the values or purposes for which the park was established;
- 2) unacceptable impacts on visitor enjoyment due to interference or conflict with other visitor use activities;
- 3) consumptive use of park resources;
- 4) unacceptable impacts on park resources or natural processes; and
- 5) unacceptable levels of danger to the welfare or safety of the public.

For these reasons, this EA provides an analysis of the potential of each alternative to leave park resources and values unimpaired relative to existing and future oil and gas operations (see Environmental Consequences Section 3.0 of this EA). The EA also provides an analysis for each resource identified as potentially affected by oil and gas operations to determine the potential for impairment.

#### **1.4.2. NPS Nonfederal Oil and Gas Regulations, 36 CFR 9B**

The authority to manage and protect federal property arises from the Property Clause of the United States Constitution. The Property Clause provides that “Congress shall have Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States . . .” U.S. Const. Art. IV, ¶ 3, cl. 2.

In 1916, Congress exercised its power under the Property Clause and passed the NPS Organic Act, 16 U.S.C. § 1 et seq. Section 3 of the Organic Act authorizes the Secretary of the Interior to “make and publish such rules and regulations as he may deem necessary or proper for the use of the parks...” 16 U.S.C. § 3.

Pursuant to Section 3 of the NPS Organic Act and individual park statutes, the Secretary of the Interior promulgated regulations at 36 CFR Part 9, Subpart B (“9B regulations”) in 1979 to “insure that activities undertaken pursuant to [nonfederal oil and gas rights] are conducted in a manner consistent with the purposes for which the National Park System and each unit thereof were created, to prevent or minimize damage to the environment and other resource values, and to insure to the extent feasible that all units of the National Park System are left unimpaired for the enjoyment of future generations.” (see 36 CFR § 9.30). The 9B regulations apply to operations that require access on or through federally owned or controlled lands or waters in connection with nonfederal owned oil and gas in all National Park System units (36 CFR § 9.30(a)).

The NPS Nonfederal Oil and Gas Rights Regulations (36 CFR 9B) and other regulatory requirements assist park managers in determining the standards for oil and gas activities so they may be conducted in a manner that protect park resources and values. NPS must determine that these activities do not impair park resources and values to the extent they preclude visitor enjoyment of the park now and for future generations. The 9B regulations provide NPS with a regulatory framework to manage the effects of oil and gas operations within the parks. The application and implementation of these regulations on the ground must be assessed parkwide for each site-specific oil and gas activity to determine if these activities have the potential to impair park resources and values.

#### **1.4.3. NPS Oversight and Monitoring of Nonfederal Oil and Gas Operations**

Under 36 CFR §9.37(f) “[a]pproval of each Plan of Operations is expressly conditioned upon the Superintendent having such reasonable access to the site as is necessary to properly monitor and insure compliance with the Plan of Operations.” At Lake Meredith National Recreation Area, park staff visits certain oil and gas sites on a regular basis. In the event of an accident or spill, staff will notify its dispatch immediately and will then immediately notify park resource managers. All approved plans of operations have a spill contingency plan that is reviewed and approved by the NPS.

Pursuant to 36 CFR §9.51(a) an “operator shall be held liable for any damages to federally-owned or controlled lands, waters, or resources, resulting from his failure to comply with this Plan of Operations” Undertaking any operations within the boundaries of a park system unit in violation of the 9B regulations shall be deemed a trespass against the United States and shall be cause for revocation of approval of an operator’s Plan of Operations. If an operator violates a term or condition of its approved plan of operation, the Superintendent has the authority to temporarily suspend the operation and give the operator the chance to cure the violation. 36 CFR §9.51(c) outlines the Superintendent’s suspension authority and procedure. If an operator fails to correct any violation or damage to federally owned or controlled lands, waters or resources the operator’s approval will be revoked (36 CFR §9.51(c)(3)).

In addition to the remedies available to the NPS under the 9B regulations, an operator is also subject to the remedial provisions found in all applicable federal, state, and local laws. For instance, under 16 U.S.C. §19jj, commonly known as the “Park System Resource Protection Act,” any person who destroys, causes the loss of, or injures any park system resource is strictly liable to the United States for response costs and for damages resulting from such destruction, loss or injury.

#### **1.4.4. Approved Park Planning Documents**

Approved park planning documents also provide a framework for determining how nonfederal oil and gas operations are conducted within Lake Meredith National Recreation Area.

An Oil and Gas Management Plan/Environmental Impact Statement (OGMP/EIS) was completed for Lake Meredith National Recreation Area in December 2002. The OGMP/EIS describes the overall approaches that will be implemented over the next 15 to 20 years, or longer, to manage existing and anticipated oil and gas operations, including the exploration, development and transportation of nonfederal oil and gas underlying Lake Meredith National Recreation Area, in a manner that provides for hydrocarbon development while protecting natural and cultural resources, human health and safety, and allowing for public use and enjoyment of those resources. The Oil and Gas Management Plan:

- 1) identifies park resources and values most sensitive to oil and gas exploration and development disturbance, and defines impact mitigation requirements to protect such resources and values
- 2) establishes reasonable oil and gas exploration and development performance standards to protect park resources and values
- 3) develops reasonable alternatives for oil and gas development in the park and analyzes the impacts of those alternatives on park resources and values
- 4) provides pertinent information to oil and gas owners and operators that will facilitate operations planning and compliance with all applicable regulations

During the scoping and development of the Plan of Operations and of this EA, the planning framework provided in the park’s OGMP have been followed. Table 1, below, summarizes many, but not all, of the Current Legal and Policy Requirements that apply to nonfederal oil and gas

operations in the park. All of the alternatives described and evaluated in this EA are subject to these requirements.

**Table 1: Current Legal and Policy Requirements Governing Nonfederal Oil and Gas Operations<sup>1</sup>**

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
<b>Statutes and Applicable Regulations</b>	
National Park Service (NPS) Organic Act of 1916, as amended, 16 U.S.C. § 1 <i>et seq.</i>	All resources, including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, and visual resources
National Park System General Authorities Act, 16 U.S.C. § 1A-1 <i>et seq.</i>	All resources, including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, and visual resources
National Park Service Omnibus Management Act of 1998, 16 U.S.C. § 5901 <i>et seq.</i>	Any living or non-living resource
NPS Nonfederal Oil and Gas Regulations – 36 CFR Part 9, Subpart B	All resources, including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, and visual resources
16 U.S.C. § 19jj (commonly referred to as Park System Resource Protection Act)	Any living or non-living resource that is located within the boundaries of a unit of the National Park System, except for resources owned by a nonfederal entity.
Enabling Act for Lake Meredith National Recreation Area, 16 U.S.C. § 460eee	Natural, cultural, scenic, scientific, and recreational values
American Indian Religious Freedom Act, as amended, 42 U.S.C. §§ 1996 – 1996a; 43 CFR Part 7	Cultural and historic resources
Antiquities Act of 1906, 16 U.S.C. §§ 431-433; 43 CFR Part 3	Cultural, historic, archeological, paleontological resources
Archeological Resources Protection Act of 1979, 16 U.S.C. §§ 470aa – 470mm; 43 CFR Part 7; 36 CFR Part 296; 32 CFR 229; 18 CFR 1312	Archeological resources
Clean Air Act, as amended, 42 U.S.C. §§ 7401q; 40 CFR Parts 50, 51, 52, 58, 60, 61, 82, 93, and 48; CFR Part 23	Air resources
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601-9675; 40 CFR Parts 279, 300, 302, 355, and 373	Human health and welfare and the environment
Endangered Species Act of 1973, as amended, 16 U.S.C. §§ 1531-1544; 50 CFR Parts 10, 17, 23, 81, 217, 222, 225, 402, and 450; 36 CFR Part 13	Plant and animal species or subspecies and their habitat, which have been listed as threatened or endangered by the U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS).
Federal Insecticide, Fungicide, and Rodenticide Act, as amended (commonly referred to as Federal Environmental Pesticide Control Act of 1972), 7 U.S.C. § 136 <i>et. Seq.</i> ; 40 CFR Parts 152-180, except Part 157	Human health and safety and the environment
Federal Land Policy and Management Act of 1976, 43 U.S.C. § 1701 <i>et seq.</i> ; 43 CFR Part 2200 for land exchanges and 43 CFR Parts 1700-9000 for all other parts for other BLM activities	Federal lands and resources administered by the Bureau of Land Management
Federal Water Pollution Control Act of 1972 (commonly referred to as Clean Water Act), 33 U.S.C. § 1251 <i>et seq.</i> ; 33 CFR 320-330; 40 CFR Parts 110, 112,	Water resources, wetlands, and waters of the U.S.

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
116, 117, 230-232, 323, and 328	
Historic Sites, Buildings, and Antiquities Act (Historic Sites Act of 1935), 16 U.S.C. § 461-467; 18 CFR Part 6; 36 CFR Parts 1, 62, 63 and 65	Historic sites, buildings, and objects
Lacey Act, as amended, 16 U.S.C. § 3371 <i>et seq.</i> ; 15 CFR Parts 10, 11, 12, 14, 300, and 904	Fish and wildlife, vegetation
Migratory Bird Treaty Act, as amended, 16 U.S.C. § 703-712; 50 CFR Parts 10, 12, 20, and 21	Migratory birds
National Environmental Policy Act of 1969, 42 U.S.C. § 4321 <i>et seq.</i> ; 40 CFR Parts 1500-1508	The human environment (e.g., cultural and historic resources, natural resources, biodiversity, human health and safety, socioeconomic environment, visitor use and experience)
National Historic Preservation Act of 1966, as amended, 16 U.S.C. §§ 470-470x-6; 36 CFR Parts 60, 63, 78, 79, 800, 801, and 810	Cultural and historic properties listed in or determined to be eligible for listing in the National Register of Historic Places
Native American Graves Protection and Repatriation Act, 25 U.S.C. §§ 3001-3013; 43 CFR Part 10	Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony
Noise Control Act of 1972, 42 U.S.C. §§ 4901-4918; 40 CFR Part 211	Human health and welfare
Oil Pollution Act, 33 U.S.C. §§ 2701-2761; 40 CFR Part 112; 33 CFR Parts 135, 137, and 150; 49 CFR Part 106; 15 CFR Part 990	Water resources, natural resources
Pipeline Safety Act of 1992, 49 U.S.C. § 60101 <i>et seq.</i> ; 49 CFR Parts 190-195	Human health and safety, and the environment
Resource Conservation and Recovery Act, 42 U.S.C. § 6901 <i>et. seq.</i> ; 40 CFR 240-280; 49 CFR 171-179	Natural resources, human health and safety
Rivers and Harbors Act of 1899, as amended, 33 U.S.C. § 401 <i>et. seq.</i> ; 33 CFR Parts 114, 115, 116, 321, 322, and 333	Shorelines and navigable waterways, tidal waters, wetlands
Safe Drinking Water Act of 1974, 42 U.S.C. § 300f <i>et seq.</i> ; 40 CFR Parts 141-148	Human health, water resources
Superfund Amendments Reauthorization Act (SARA) Title III, Tier II, and Community Right to Know.	Human health and safety
<b>Executive Orders</b>	
Executive Order 11593 – Protection and Enhancement of the Cultural Environment, 36 Fed. Reg. 8921 (1971)	Cultural resources
Executive Order 11988 - Floodplain Management, 42 Fed. Reg. 26,951 (1977)	Floodplains, human health, safety, and welfare
Executive Order 11990 – Protection of Wetlands, 42 Fed. Re. 26,961 (1977)	Wetlands
Executive Order 12088 – Federal Compliance with Pollution Control Standards, 43 Fed. Reg. 47,707 (1978)	Natural resources, human health and safety
Executive Order 12630 – Governmental Actions and Interference with Constitutionally Protected Property Rights, 53 Fed. Reg. 8859 (1988)	Private property rights, public funds
Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, amended by Exec. Order No. 12948, 60 Fed. Reg. 6379 (1995)	Human health and safety
Executive Order 13007 – Indian Sacred Sites, 61 Fed. Reg. 26,771 (1996)	Native Americans’ sacred sites
Executive Order 13112 – Invasive Species, 64 Fed. Reg. 6183 (1999)	Vegetation and wildlife
Executive Order 13186-Responsibilities of Federal Agencies to Protect Migratory Birds, 66 Fed. Reg. 3853 (2001)	Migratory Birds
Executive Order 13211-Actions Concerning	

<b>AUTHORITIES</b>	<b>RESOURCES AND VALUES AFFORDED PROTECTION</b>
Regulations That Significantly Affect Energy Supply, Distribution, or Use (2001)	
Executive Order 13212-Actions to Expedite Energy-Related Projects (2001)	
<b>Policies, Guidelines and Procedures</b>	
NPS Management Policies (2002)	All resources, including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, visual resources
Dept. of the Interior, Departmental Manual, DM 516 – NEPA policies	All resources, including cultural resources, historic resources, natural resources, human health and safety
Dept. of the Interior, Departmental Manual, DM 517 - Pesticides	Human health and safety and the environment
Dept. of the Interior, Departmental Manual, DM 519 – Protection of the Cultural Environment	Archeological, prehistoric resources, historic resources, Native American human remains, and cultural objects
Dept. of the Interior, Onshore Oil and Gas Order Number 2, Section III, Drilling Abandonment Requirements, 53 Fed. Reg. 46,810-46,811 (1988)	Human health and safety
NPS Director’s Order #12 and Handbook – National Environmental Policy Act (2001)	All resources including natural resources, cultural resources, human health and safety, socioeconomic environment, visitor use
NPS Director’s Order #28 – Cultural Resource Management (1997)	Cultural, historic, and ethnographic resources
NPS 66 – Minerals Management Guideline (1990)	Natural resources, human health and safety
NPS 77 – Natural Resources Management Guideline (1991)	Natural resources
NPS Director’s Order #77-1 – Wetland Protection	Wetlands
NPS Special Directive 93-4 – Floodplain Management Guideline	Floodplains
Secretary of the Interior’s “Standards and Guidelines for Archeology and Historic Preservation,” 48 Fed. Reg. 44716 (1983), also published as Appendix C of NPS Director’s Order 28 – Cultural Resource Management	Cultural and historic resources
Government-to-Government Relations with Native American Tribal Governments, Presidential Memorandum signed April 29, 1994	Native Americans – Tribal rights and interests
Geologic Hazards and Features Special Management Areas	Geologic hazards and features
<b>Selected Texas Laws and Regulations</b>	
Title 2 Texas Natural Resources Code Chapter 40 (Oil Spill Prevention and Response Act of 1991, also liability for natural resources damages from spills), TEX. NAT. RES. CODE tit. 2, § 40 (1991)	Human health and safety, natural resources
Texas Health & Safety Code Chapter 361	Waste disposal, surface and groundwater resources
Texas Parks & Wildlife Code Chapter 68	State endangered and threatened species
Title 3 Texas Natural Resources Code Chapters 81 through 85 (oil and gas operations) (TAC tit. 16, part 1, § 3)	Human health and safety, natural resources
Title 16 Texas Administrative Code Part 1 Chapter 3 – Railroad Commission of Texas, Oil and Gas Division	Human health and safety, natural resources

## 1.5. SCOPING

Early in the planning and development of the Plan of Operations, by Pioneer and its contractor, URS Corporation, met with NPS to identify resources, values, and other concerns that could be potentially impacted by the proposal. In addition, early input from other federal, state, and local agencies was sought. Scoping was performed with the U.S. Fish and Wildlife Service (FWS), Texas Parks and Wildlife Department, Texas State Historic Preservation Officer, and 10 affiliated Indian tribes, by telephone, written correspondence, and meetings. Scoping involved identifying major issues, and defining appropriate alternatives, impact determinations, and mitigation measures. With the exception of one letter from the Mescalara Apache Tribe, no other comments or letters were received from the public or federal, state, and local agencies. The Mescalara Apache Tribe comments indicated that nothing of concern would be affected.

## 1.6. ISSUES AND IMPACT TOPICS EVALUATED

During project scoping, a wide range of resources and values were identified that could be effected by the proposed action. From these, the NPS identified the following park resources, values, and other concerns that would be analyzed in detail in this EA.

- nonfederal oil and gas development
- geology and soil resources
- floodplains
- vegetation
- wildlife
- visitor use and experience

Other issues that were not carried through for detailed analysis are discussed in Section 1.7.

Based on the above list of park resources, values, and other concerns identified during scoping, issue statements were developed to define problems or benefits pertaining to the proposal. The issue statements in Table 2, below, describe a cause-and-effect relationship between an activity and a resource, value, or concern. The issue statements were used in developing and evaluating alternatives.

**Table 2: List of Issue Statements**

<b>NONFEDERAL OIL AND GAS DEVELOPMENT</b>
The NPS permitting process, regulatory requirements, and operating stipulations generally increase the cost to operate on parklands, compared to operating on non-NPS lands. These increased costs could reduce income to mineral owners (or mineral interest holders) and operators, and influence an owner's or operator's decision to defer, modify undertake as planned, or not conduct certain nonfederal oil and gas operations.
Production of the nonfederal mineral interest would contribute hydrocarbon resources to meet the nation's domestic energy demands.
<b>GEOLOGY AND SOIL RESOURCES</b>
Oil and gas activities including vehicle use; and construction, maintenance, and use of roads, well pads, production facilities, flowlines and pipelines would increase surface runoff; increase soil erosion, cause caprock sloughing and landslides, rutting and compaction; and adversely affect soil properties such as permeability.
Soils compacted by vehicles could reduce soil permeability, and change surface drainage patterns. In general, clayey soils are more subject to compaction than sandy soils.
Vehicle use, particularly from heavy vehicles transporting the drilling rig, water, and drilling muds for disposal outside the park, could cause rutting and compaction of the soil. Soils compacted by vehicles could reduce soil permeability, and change surface drainage patterns. In general, clayey soils are more subject to compaction than sandy soils.
The release of hydrocarbons or other contaminating and hazardous substances from vehicles and equipment,

exploration and production operations, and flowlines and pipelines could alter the soil's chemical and physical properties. Changes in soil properties would result from direct contact with contaminants or indirectly via runoff from contaminated areas.

The integrity of unique features such as Dolomite Caprock and flint quarries in Alibates Flint Quarries National Monument (a nationally-significant cultural resource) would be adversely affected by surface uses for drilling and production operations and would not be adequately reclaimed following operations.

## **FLOODPLAINS**

Reclamation of the oil and gas access road and well pad could adversely affect floodplain functions, values and uses over the short-term. However, long-term benefits include the re-establishment of surface and surface water flow, the control of non-native vegetation, and re-establishment of native vegetative communities

Floodplains are represented by the various pool elevations designed for Lake Meredith, and natural river/stream corridors. In some cases there may be no practicable alternative to locating roads, well pads, production facilities, and flowlines and pipelines in or across floodplains. These activities would potentially harm (from the hydraulic and erosive forces of flooding) life, property, and floodplain resources, functions, values, and uses.

The siting, maintenance, and use of roads, well pads, production facilities, and flowlines and pipelines in floodplains, or the release of hydrocarbons, and contaminating or hazardous substances from these operations, would adversely affect floodplain functions, values and uses, including; the natural moderation of floods; water quality; sediment control; groundwater recharge or discharge; fish and wildlife habitat; maintenance of biodiversity; recreational opportunities, and natural beauty.

Reclamation activities such as re-establishing the contour of the area, surface and subsurface water flow; controlling non-native vegetation; and reestablishing native vegetation communities could restore natural and beneficial floodplain functions, values, and uses.

Reclamation of the oil and gas access roads and well pads could adversely affect floodplain functions, values and uses over the short-term. However, long-term benefits include the re-establishment of surface and surface water flow, the control of non-native vegetation, and re-establishment of native vegetative communities.

## **VEGETATION**

Vegetation could be routinely cut along flowlines and pipelines or totally removed in areas for the construction of well pads, production facilities, and flowlines and pipelines. Vegetation removal could change the structure and composition of vegetation communities; alter wildlife habitat and species composition; increase storm runoff; and increase soil erosion and sedimentation in adjacent streams. Removal or disturbance to rare or State- and/or globally imperiled Plant Communities of Texas could jeopardize their long-term preservation.

Construction and use of the oil and gas access roads, well pads, production facilities, and flowlines and pipelines could disrupt surface and subsurface water flow that is necessary to maintain vegetation communities.

The release of hydrocarbons, and contaminating and hazardous substances could damage or kill vegetation via direct contact with contaminants, or indirectly via pathways from contaminated areas.

Reclamation of oil and gas sites could re-establish native vegetation communities and surface and subsurface drainage patterns necessary to support vegetation growth.

Disturbances/removal of native vegetation could lead to the unintentional spread and establishment of non-native plant species transported in or on drilling and maintenance equipment.

## **WILDLIFE**

Oil and gas activities, including vehicle use and the construction, maintenance, and use of the oil and gas access road, well pad, production facility, and flowline could increase predation in open areas; directly harm or kill wildlife; and disrupt wildlife feeding, denning, nesting, spawning/reproduction, and other behavior. Oil and gas activities could also result in avoidance of the area by wildlife due to increased noise and human presence.

Loss or modification of wildlife habitat could occur from the construction of the oil and gas access road, wellpad, production facility, and flowline. These activities could increase edge effects, increase human access, and alter wildlife species, composition, and migration.

Liquids that collect in secondary containment structures at the oil and gas production site could attract, harm, and possibly kill birds.

The release of hydrocarbons and hazardous or contaminating substances from vehicles, drilling and production equipment, and pipelines could injure wildlife. The adverse effects could become worse over time if wildlife species ingest the contaminants and are consumed by other wildlife species.

Heavy equipment used for reclamation operations could injure or kill wildlife over the short-term. However, reclamation of oil and gas sites over the long-term could re-establish native vegetative communities and surface and subsurface water quality and quantity that support wildlife populations.

## **VISITOR USE AND EXPERIENCE**

Oil and gas operations could pose a threat to human health and safety from a number of sources, including, the use of roads by commercial vehicles (particularly vehicles with less maneuverability and visibility); hazardous equipment at wells and production facilities; and flowline or pipeline failure. The spill or release of hydrocarbons, and contaminating

and hazardous substances would be inhaled, absorbed, or ingested by human beings.

The oil and gas operations could adversely affect air quality; alter scenic resources and the night sky; increase background sound levels and could degrade the quality of visitor uses and experiences in the park. These effects could adversely affect or preclude visitor uses and experiences in certain areas of the parks, particularly associated with Lake Meredith, such as hunting, fishing, boating, swimming, picnicking, camping, participating in NPS programs, nature study, and solitude.

## **1.7. ISSUES AND IMPACT TOPICS DISMISSED FROM FURTHER EVALUATION**

Impact topics may be dismissed from evaluation from an EA when, through the application of mitigation measures, there would be “minor or less effects, and there is little controversy on the subject or reasons to otherwise include the topic”. For cultural resources, wetlands, floodplains, and species of management concern, these impact topics are normally dismissed if there are no measurable adverse impacts or they are not present in the analysis area. The following topics have been eliminated from further analysis in this environmental assessment for the reasons described.

### **1.7.1. Environmental Justice**

Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed action would not have disproportionate health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency’s Environmental Justice Guidance (1998), because no minority or low income population exists in the study area that would be adversely affected by oil and gas developments within the park. Therefore, environmental justice was dismissed as an impact topic in this EA.

### **1.7.2. Adjacent Landowners and Uses**

Ranching and farming are the major land uses in the region. Oil and gas operations are important, with the production and processing of petroleum a major employer. Food processing – grain milling, meatpacking, and sugar processing – is another major industry in the region. Private land development adjacent to the boundaries of Lake Meredith National Recreation Area has produced a mixed community of mobile home sites, permanent residences, and a variety of vacation cottages. Lake Meredith National Recreation Area is situated within the Panhandle Field, which covers about 1,475,000 acres and produces both oil and gas resources. Within the park, there are 167 active oil and gas operations of which 145 (87%) are gas wells and 22 (13%) are oil wells. In the vicinity of the park, the oil and gas producing area is called the Panhandle West Field. The 22 natural gas wells to be re-entered, the new well (H-2), and the operation of the 45 natural gas wells and associated pipelines described and evaluated in this EA are located within the park; therefore, adjacent landowners and uses are not expected to be adversely affected and are not discussed further.

### **1.7.3. Prime and Unique Farmlands**

In August 1980, the Council on Environmental Quality (CEQ) directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture’s Natural Resources Conservation Service (NRCS) as prime or unique. Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. According to NRCS, no lands in the project area are classified as prime and unique farmlands. Therefore, the topic of prime and unique farmlands was dismissed as an impact topic in this EA.

#### 1.7.4. Air Quality

Lake Meredith National Recreation Area is approximately 40 miles northeast of Amarillo and approximately 15 miles west of Borger, Texas. It is in the Upper Panhandle (Region 1) air quality-monitoring district and straddles three counties: Hutchinson, Moore, and Potter (although the majority of the unit is in Hutchinson County). During most of the year, prevailing airflow is from the southwest. Lake Meredith National Recreation Area is designated as a Class II air shed for purposes of air quality by The State of Texas. The park's air quality is protected by allowing limited increases over baseline concentrations of sulfur dioxide, nitrogen oxides, and particulate matter.

The Texas Commission on Environmental Quality (TCEQ), formerly the Texas Natural Resources Conservation Commission, is the lead environmental agency for the state. The State Implementation Plan is Texas' plan for complying with the federal Clean Air Act. The plan consists of narrative, rules, and agreements that Texas will use to clean up polluted areas, and it is regularly revised (TCEQ 2002a). According to the Amarillo regional office (the office closest to Lake Meredith), air contaminants from industrial sources in Borger (a Phillips Petroleum refinery, an associated chemical plant, and several carbon black plants) may affect the unit, but not to a substantial degree (TCEQ 2002b).

Under Alternative B, Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and, in addition would re-enter 22 of these gas wells and drill 1 new vertical well. Construction and maintenance of the well/production pad and access roads and pipelines would result in localized and intermittent, short-term, negligible increased emissions of particulate matter from ground-disturbing activities, importing and compacting base materials, and vehicle exhaust. Emissions of particulate matter, nitrogen oxides, carbon monoxide, carbon dioxide, and sulfur dioxide would be greatest during the short-term drilling operations due to increased use of vehicles and large gasoline and diesel engines used to power the drill rig, pumps, and auxiliary equipment. The application of mitigation measures, particularly incorporating the use of a dust collection tank and dust suppression system during air drilling activities (i.e. the dust would be routed to the tank through a 7" blooey line) would reduce air particulate matter emissions. In addition, the tank would be set up with a fresh water spray system to minimize dust particles generated during air drilling activities. Emissions that would occur during the drilling phase of operations would result in localized and intermittent, short-term, negligible to minor adverse impacts on air quality.

Under Alternative B, the Plan of Operations, as submitted, includes use of the following:

- A fresh water spray system to minimize dust when needed
- A closed loop "zero discharge system" for drilling the well. No earthen pits would be utilized. All mud, drill cuttings, sewage and produced water would be collected in steel tanks for re-use or hauled by sealed dump trucks for disposal at state-approved disposal facilities outside of the park boundaries
- An air motor versus a mud motor downhole to mill the windows
- An affidavit by Pioneer to operate in compliance with all applicable Federal, State, and local laws and regulations

These measures, in addition to Pioneer's existing performance bond, would ensure rapid response in the event of a leak or spill, thereby providing better assurance that air quality impacts would be

minimized. Air quality impacts during the long-term production of operations (20 years or longer) would be similar to those that would occur during drilling but at reduced levels, resulting in localized, short to long-term, negligible to minor adverse impacts on air quality. Therefore, the topic of air quality was dismissed as an impact topic in this EA.

#### **1.7.5. Species of Management Concern**

Federally listed threatened, endangered, or candidate species that either are or may be potentially found in Lake Meredith National Recreation Area include the bald eagle, black-tailed prairie dog (historically an extirpated species), Arkansas River shiner, lesser prairie chicken (potential resident in higher elevations of flat land), mountain plover (potential habitat for a species considered migratory by the Texas Parks and Wildlife Department), whooping crane (potential seasonal migratory species), and the interior least tern (potentially along the Canadian River corridor, although the nearest known colony is 75 miles east of the park in Oklahoma). There are no known federally threatened or endangered plants in the park. Species of concern and state-listed species that either are or may be found in the park include the American peregrine falcon, the arctic peregrine falcon (a possible winter migrant), the Texas horned lizard, and the Mexican mud-plantain (plant species). Within Lake Meredith National Recreation Area, Arkansas River shiner critical habitat was designated along the Canadian River from the western park boundary downstream to the confluence with Coetas Creek, including a lateral distance of 300 feet on each side of the river beyond bank full width.

Mr. Omar Bocanegra, United States Fish & Wildlife Service, was contacted on February 20, 2002 regarding potential threatened and endangered species near the existing well and new well locations. The most current list of threatened and endangered species in the park area is found in the *Final Oil and Gas Management Plan – Environmental Impact Statement* that the park developed in April 2002. The continued operation of the existing 45 wells and use and maintenance of existing access roads and pipelines, the re-entry of 22 of the 45 existing wells, and drilling one new well and associated pipelines will not likely affect threatened and endangered species or their critical habitat. The United States Fish & Wildlife Service concurred that there would be no effect on federally listed threatened and endangered species (Paul Eubank personal communication with USFWS, November 2003). Therefore, federally and state listed threatened and endangered species will not be further addressed in this EA.

#### **1.7.6. Socioeconomic Environment**

Local and regional socioeconomics was dismissed as an impact topic in this EA because the proposed action would have negligible impact on the local or regional economics. It would not change any local or regional land uses or ownership, nor impact local businesses or their agencies. Therefore, the socioeconomic environment will not be further addressed in this EA.

#### **1.7.7. Cultural Resources**

The National Historic Preservation Act, as amended in 1992 (16 USC 470 et seq.); the National Environmental Policy Act of 1969 (42 USC 4321 et seq.); and the National Park Service's Director's Order #28, *Cultural Resource Management Guideline* (1997), *Management Policies*, 2001 (2000), and *Director's Order #12, Conservation Planning, Environmental Impact Analysis, and Decision Making* (2001) require the consideration of impacts on cultural resources listed in or eligible to be listed in the National Register of Historic Places. The National Park Service recognizes five categories of cultural resources: historic structures; ethnographic resources; cultural landscapes; archeological resources; and museum collections.

There are no historic structures, ethnographic resources, or cultural landscapes within or near the existing or proposed operation areas, and no museum collections would be affected by the proposal. During project scoping, a literature search was conducted to determine the extent and continuing adequacy of past archeological surveys that had been performed in the analysis area. An inventory for archeological resources was conducted, which covered a majority of the park. Archeological data are lacking in some areas; therefore, Pioneer contracted for, and the NPS permitted, further archeological surveys to be conducted. Drs. Suzanna and Paul Katz of PRIAM were used to survey for archeological resources in the area of the existing gas wells and the new well. Both have a PH.D. in anthropology and over 7 years experience conducting surveys at Lake Meredith National Recreation Area and over 30 years experience in the High Plains area. The survey was conducted between March 2001 and March 2002 and found no archeological or historic resources in the survey area. The survey was submitted to the State Historic Preservation Office (SHPO) for review and approval. To date, receipt of the SHPO written concurrence of “no adverse affect” has not been received. Since there would be no measurable adverse effects to cultural resources, this topic will not be further addressed in this EA.

#### **1.7.8. Paleontological Resources**

Three important fossil-bearing rock units are exposed within and around Lake Meredith National Recreation Area. They are the Triassic Dockum Group, the Tertiary Ogallala Formation and the Pleistocene-aged deposits. The 45 existing natural gas well sites and the new well location (Bivins H-2) were correlated with a map developed by Dr. Adrian Hunt for the park’s Oil and Gas Management Plan/Environmental Impact Statement showing Areas of High Probability for Discovery of Paleontological Resources. In addition, a field assessment of paleontological resources at the existing wells and new well (Bivins H-2) was performed by Wes Phillips in March 2002. No paleontological resources were discovered. Based on the map correlations, the proposed natural gas operations are located in areas with low probability for discovery of paleontological resources. In addition, with the application of mitigation measures detailed in the park’s Oil and Gas Management Plan and Final Environmental Impact Statement (April 2002), and incorporated into the Plan of Operations, any impacts to the paleontological resources discovered during construction would be avoided or minimized further. Therefore, there would be negligible to minor impacts to paleontological resources, and this resource will not be addressed further in this EA.

#### **1.7.9. Wetlands**

The majority of the wetlands in the park are in the southern half of the recreation area, with large areas of palustrine wetlands, along with smaller areas of lacustrine and riverine wetlands. Wetlands also occur along Big Blue Creek, South Turkey Creek, in the stilling basin below the dam, and within the canyons on the periphery of the lake (NPS 2002b). Neither the existing wells, nor the new well, are located in or near of any of these wetland areas within the park. Regarding existing pipelines, flow lines, and gathering lines, any maintenance, repair, or renovation in previously disturbed pipeline areas that is expected to adversely impact more than 0.1 acres of a wetland will require NPS approval prior to initiation of work. Therefore, there would be no measurable impacts to wetlands from the proposed action, and wetlands were dismissed as an impact topic.

#### **1.7.10. Water Resources**

Lake Meredith National Recreation Area contains important water resources, including the surface of the lake and tributaries, plus groundwater contained in various aquifers beneath the park. Much of the water has high concentrations of solids, and some shallow groundwater has been affected by

nonpoint pollution sources such as sewage and oil field brine. The proposed action has the potential to affect water quality from accidental leaks and spills of drilling fluids during workovers, hazardous waste spills including diesel fuel, rupture of flowlines, spills from tanker trucks, and lubricant leaks from compressors. However, there are no streams or other bodies of water located directly adjacent to any well sites, and there are many mitigation measures that would be followed to minimize the potential for adverse impacts to water quality. The Plan of Operations, as submitted, includes procedures for erosion control measures, secondary containment, and routine maintenance of access roads, well pads and equipment for all current operations. During drilling activities all water used will be brought in by a truck. All actions would adhere to the NPS's SOP for the Construction and Maintenance of Oil and Gas Access Roads in Lake Meredith National Recreation Area and Alibates Flint Quarries NM. This would ensure that soil erosion and sedimentation would be minimized. Reclamation would include revegetation with native species to 70% cover, thereby ensuring that soil erosion would be minimized and sedimentation of waterways would be avoided or minimized. In addition, a spill control plan and an affidavit by Pioneer to operate in compliance with all applicable Federal, State, and local laws and regulations was prepared. With application of the mitigation measures discussed above, impacts to water resources would be limited to localized, short to long-term, negligible to minor adverse impacts. Therefore, water resources were not further evaluated as an impact topic in this EA.

## **Fish**

Fish populations in Lake Meredith are plentiful, making the lake one of the most popular fishing areas of the region. Most fishermen use developed boat launch areas at Blue West, Fritch Fortress, Cedar Canyon and Sanford-Yake to access other areas of the lake. Fish species include walleye, catfish, largemouth and sand bass, crappie, bluegill, and carp. Some shoreline fishing takes place in these developed areas, but most fishing takes place from boats upon the waters of Lake Meredith. However, there are not any Pioneer gas wells located directed adjacent to the lake waters. The Plan of Operations, as submitted, includes procedures for erosion control measures, secondary containment and routine maintenance of access roads, well pads and equipment for all current operations. During drilling activities all water used will be brought in by a truck. All actions would adhere to the NPS's SOP for the Construction and Maintenance of Oil and Gas Access Roads in Lake Meredith National Recreation Area and Alibates Flint Quarries NM. This would ensure that soil erosion and sedimentation would be minimized. Reclamation would include revegetation with native species to 70% cover, thereby ensuring that soil erosion would be minimized and sedimentation of waterways would be avoided or minimized. In addition, a spill control plan and an affidavit by Pioneer to operate in compliance with all applicable Federal, State, and local laws and regulations was prepared. With application of the mitigation measures discussed above, impacts to Fish resources would be limited to localized, short to long-term, negligible to minor adverse impacts. Therefore, fish resources were not further evaluated as an impact topic in this EA.

## 2.0 ALTERNATIVES

Two Alternatives, A and B, are described and evaluated in this EA. Three summary tables are provided that compare the two alternatives. This section concludes with an analysis for selecting the environmentally preferred alternative.

### 2.1.1. Alternative A, No Action

The No Action Alternative is required under the National Environmental Policy Act (NEPA) and establishes a baseline for comparing the present management direction and environmental consequences of the action alternative. Under the No Action alternative, Pioneer Natural Resources, Inc. would continue to operate and maintain 45 natural gas wells and associated pipelines and access roads as specified under their ratified Plan of Operations. None of the wells would be re-entered/redrilled and no new wells would be drilled.

The continuing operation of the existing 45 natural gas wells and associated pipelines and access roads were addressed in a Plan of Operations by Colorado Interstate Gas (CIG) on December 27, 1988. When CIG acquired the operations, they had been grandfathered, and the transfer of ownership required new permitting from the Railroad Commission of Texas, thereby triggering compliance with the NPS's 36 CFR 9B regulations. CIG then transferred the operations to Mesa Operating Limited Partnership effective January 1, 1990. Mesa, rather than prepare a new Plan of Operations, ratified CIG's approved Plan of Operations on March 21, 1990. Mesa and Parker & Parsley Petroleum Company merged on August 7, 1997, to become Pioneer Natural Resources USA, Inc. Due to the name change, Pioneer had a choice to either ratify the approved CIG/Mesa Plan of Operations, or to submit a new plan. Pioneer ratified the CIG/Mesa Plan of Operations which serves as their permit to continue operation and maintenance of their operations. Because Pioneer began working on its new comprehensive Plan of Operations (Alternative B) prior to the NPS completing an Oil and Gas Management Plan/Environmental Impact Statement for Lake Meredith National Recreation Area and Alibates Flint Quarries National Monument on December 3, 2002, the NPS did not pursue supplementing the ratified plan to incorporate the application of the pertinent Oil and Gas Management Plan provisions. Therefore, Alternative A, No Action, for purposes of this EA means that Pioneer would continue to operate and maintain the existing 45 natural gas wells and associated pipelines and access roads under the ratified CIG/Mesa Plan of Operations.

The legal descriptions for all 45 Pioneer wells located within the park boundaries including those proposed for re-entry and the new well (Bivins H-2) under Alternative B, are provided on Table 33.

**Table 3: Legal Description of Pioneer Natural Resources Wells**

LOCATION								
	WELL NAME	API #	RRC ID	COUNTY	SE C	BLOCK	SURVEY	LEGAL LOCATION
1	*Bivins A-29	4234100689	023299	MOORE	55	BLK 47	H&TC SURVEY	885' FS'lyNL & 355 FWL
2	*Bivins A-42	4237500340	023311	POTTER	97	BLK 46	H&TC SURVEY	4,993' FS'lySL & 1,180' FE'lyEL
3	*Bivins A-46	4237500099	023315	POTTER	11	BLK 5	G&M SURVEY	1,400' FNL & 4,282' FEL
4	*Bivins A-	423750037	02331	POTTER	10	BLK 46	H&TC	5,280' FSL &

LOCATION								
	WELL NAME	API #	RRC ID	COUNTY	SE C	BLOCK	SURVEY	LEGAL LOCATION
	49	2	8		5		SURVEY	1,000' FEL
5	*Bivins A-53	4237500380	023322	POTTER	107	BLK 46	H&TC SURVEY	3,506' FN'lySL & 660' FN'lyEL
6	*Bivins A-136	4237500147	023399	POTTER	20	BLK 5	G&M SURVEY	2,131' FSL & 330' FEL
7	Bivins A-160	4223307742	023418	HUTCHINSON	90	BLK 46	H&TC SURVEY	7872' FSL - 850' FEL
8	Bivins A-165	4237500348	033025	POTTER	99	BLK 46	H&TC SURVEY	600 FSL - 430 FWL
9	*Bivins A-166	4237500376	033026	POTTER	106	BLK 46	H&TC SURVEY	5,650' FSL & 430' FWL
10	Bivins A-206	4237531512	169635	POTTER	97	BLK 46	H&TC RR SURVEY	5028' FMSSL & 1011'
11	Bivins A-208	4237531492	169413	POTTER	11	BLK 5	G&M SURVEY	409' FMNL & 661' FMWL
12	Bivins H-1	4234100849	023430	MOORE	95	BLK 46	H&TC SURVEY	4747' FNSL - 309' FEL
13	*Fee A-2	4234100679	023455	MOORE	53	BLK 47	H&TC SURVEY	4,094 FS'lyNL & 1,125 FS'lyWL
14	*Masterso n A-9	4237500217	023487	POTTER	36	BLK B10	EL&RR SURVEY	1,494' FNL & 1,800' FEL
15	*Masterso n B-3	4237500485	023511	POTTER	42	BLK 3	G&M SURVEY	1,400' FS'lyNL & 2,705' FE'lyEL
16	*Masterso n B-11	4237500258	023515	POTTER	56	BLK 47	H&TC SURVEY	4,252' FNL & 1,400' FEL
17	*Masterso n B-13	4237500262	023517	POTTER	58	BLK 47	H&TC SURVEY	2,000' FW'lyNL & 1,297' FEL
18	*Masterso n B-20	4237500198	023524	POTTER	33	BLK 3	G&M SURVEY	1,503' FNL & 910 FN'lyEL
19	*Masterso n B-23	4237500271	023527	POTTER	61	BLK 47	H&TC SURVEY	11,280' FNL & 330' FWL
20	*Masterso n B-25	4237500269	023529	POTTER	60	BLK 47	H&TC SURVEY	6,000 FS'lyNL & 1,000' FS'lyWL
21	*Masterso n B-26	4237500274	023530	POTTER	63	BLK 47	H&TC SURVEY	7,858' FN'lyNL & 1,200' FN'lyWL
22	Masterson B-29	4237500178	023533	POTTER	28	BLK 3	G&M SURVEY	3,178' FSL & 1,400' FEL
23	*Masterso n B-31	4237500284	023535	POTTER	65	BLK 47	H&TC SURVEY	2,500' FN'lyNL & 1,282' FWL
24	*Masterso n B-51	4237500168	023553	POTTER	25	BLK 3	G&M SURVEY	2000 FSL - 2080 FEL
25	*Masterso	423750022	02357	POTTER	38	BLK	EL&RR	1,850' FNL &

LOCATION								
	WELL NAME	API #	RRC ID	COUNTY	SE C	BLOCK	SURVEY	LEGAL LOCATION
5	n B-73	7	2			B10	SURVEY	950' FWL
2 6	*Masterson B-80	423750040 7	02357 6	POTTER	62	BLK 47	H&TC SURVEY	10,490' FS'lyNL & 330' FWL
2 7	*Masterson B-93	423750026 3	03339 7	POTTER	58	BLK 47	H&TC SURVEY	7,300' FW'lyNL & 1,200' FEL
2 8	*Sneed E-1	423410152 0	02363 6	MOORE	7	BLK NONE	MS JOHNSON SURVEY	1,372' FSL & 1,347' FEL
2 9	Warrick A-3	423410085 3	02365 9	MOORE	96	BLK 46	H&TC SURVEY	6280 FSL - 1000 FEL
3 0	Warrick A-5	423410084 5	02366 1	MOORE	94	BLK 46	H&TC SURVEY	5920 FSL - 400 FEL
3 1	Bivins 6R	423750023 6	02705 8	POTTER	40	BLK M20	G&M SURVEY	2100 FNL - 1480 FWL
3 2	Bivins 11R	423750023 8	02706 3	POTTER	41	BLK M20	G&M SURVEY	1200 FSL - 460 FWL
3 3	Bivins 20R	423750033 9	04130 7	POTTER	97	BLK 46	H&TC SURVEY	4960 FSL - 1345 FEL
3 4	Bivins 75R	423413023 3	06387 6	MOORE	95	BLK 46	H&TC SURVEY	4200 F 2ND MSSSL - 3
3 5	Bivins 85R	423413055 4	08328 9	MOORE	54	BLK 47	H&TC SURVEY	330 FMSNL - 330 FEL
3 6	Bivins A-160R	422330774 2	02707 1	HUTCHINSON	90	BLK 46	H&TC SURVEY	7872 FSL - 850 FEL
3 7	Fee 3R	423410068 0	03777 6	MOORE	53	BLK 47	H&TC SURVEY	500 FNL - 540 FEL
3 8	Masterson 5R	423750028 3	02708 0	POTTER	65	BLK 47	H&TC SURVEY	3600 FNL - 1200 FWL
3 9	Masterson 58R	423753007 7	05464 0	POTTER	28	BLK 3	G&M SURVEY	900 FNL - 700 FWL
4 0	Masterson 68R	423753013 7	05624 7	POTTER	29	BLK 3	G&M SURVEY	330 FSL - 330 FWL
4 1	Masterson 85R	423753019 8	05978 3	POTTER	64	BLK 47	H&TC SURVEY	4600 FSL - 330 FWL
4 2	Masterson B-100R	423753014 0	05696 1	POTTER	65	BLK 47	H&TC SURVEY	6800 FNL - 600 FEL
4 3	Sneed 1R	423410026 2	02709 5	MOORE	7	BLK NONE	MS JOHNSON SURVEY	330 FSL - 1250 FEL
4 4	Warrick 3R	423750033 6	02709 9	POTTER	96	BLK 46	H&TC SURVEY	330 FSL - 990 FEL
4 5	Warrick 4R	423410084 6	03352 2	MOORE	94	BLK 46	H&TC SURVEY	5980 FSL - 522 FEL
4 6	*Bivins H-2	423413285 6	NA	MOORE	95	BLK 46	H&TC SURVEY	3,667' FN'lySL & 337' FE'lyEL

\* Wells proposed for re-entry. Bivins H-2 is scheduled as new drill as well as re-entry at a later date. A new railroad commission identification number will be issued once the Bivins H-2 well has been drilled.

## DESCRIPTION OF WELL AND PIPELINE OPERATIONS AND MAINTENANCE

Oil and gas operations in Lake Meredith National Recreation Area are producing from the Panhandle Field, which is predominantly a gas field. Gas wells in the Panhandle Field are drilled to a shallow depth; because the gas reservoirs in the Panhandle Field are under-pressurized, drilling is normally accomplished by air drilling rather than circulating drilling muds. The under-pressurized reservoirs require the use of compressors to bring the gas to the surface, and to transport product through flowlines and gathering lines. Of the 167 active oil and gas operations in Lake Meredith National Recreation Area, 145 (87%) are gas wells, while only 22 (13%) are oil wells. They are owned and operated by 17 companies.

Because of the high volume of gas wells, it is common at Lake Meredith National Recreation Area for one operator to own and operate a wellhead and the associated equipment to bring natural gas products to the surface, while another operator owns and operates the gathering system to transport the products to market. In this case, Pioneer owns and operates the 45 natural gas wells and the associated equipment to develop the natural gas products. In addition, Pioneer also owns and operates the gathering pipeline system to transport the gas products from the meterhouse to market.

Leaks and spills of oil, gas, and other contaminating and hazardous substances are a primary concern from all types of oil and gas operations. Leaks and spills could occur during drilling and routine workovers for both oil and gas wells. However, because of the under-pressurized nature of the Panhandle Field, the possibility for blowouts during well drilling is nonexistent. Leaks and spills during drilling and workovers are more likely to result from poorly maintained equipment or refueling of gasoline and diesel motors.

The potential for leaks and spills from the long-term operation of gas wellheads and appurtenant equipment is substantially less for gas well operations in comparison to oil wells primarily because of the lack of treatment and storage facilities. Gas wellheads have little or no potential for leaks and spills because they have no moving parts. Although no plans exist for adding additional compressors, Pioneer plans to remove all but three of their fifteen compressors (Bivins H-1, Masterson B-31, and Masterson B-20) from park property. It is Pioneer's intent to have the majority of the compressors removed from the park by winter 2004. The compressor located at Masterson A-9 would be removed after proposed re-entry activities (planned in Spring 2004). Bivins H-1 and Masterson B-31 have electric compressors and those units would remain in place. The compressor located at the Masterson B-20 is a gas engine driven unit and would remain on Lake Meredith National Recreation Area property. The design of the existing compressor systems would be improved after results from the rework activities have been evaluated.

Over the long term, leaks and spills at the 45 natural gas wells could occur as a result of failing or failed seals on the three compressors, corrosion or rupture along flowlines and gathering lines, and collection of produced waters from the drips stations. The existing wells were drilled 5 to 41 years ago. Pioneer anticipates the life of the wells to further continue 10 to 25 years. Table 4 provides a brief description of each of the 45 existing wells.

**Table 4: Description of 45 Existing Natural Gas Wells**

	Well Name	Completion Date	Total Depth	Producing Zone	Description of Operations
1	Bivins A-29	Unknown	2490'	Brown Dolomite	107' x 20' fenced/gated area with wellhead, 150-gallon AST, telemetry system, and flow meter house. Compressor and AST off park property approximately 25 feet south. Wellhead is painted tan. Ground Elevation: 3,181 feet Total pad surface disturbance: 0.24 acres
2	Bivins A-42	12/13/68	2348'	Brown Dolomite	105' x 20' fenced/gated area with wellhead and flow meter house. Wellhead is painted tan. Ground Elevation: 3,189 feet Total pad surface disturbance: 0.95 acres
3	Bivins A-46	1/7/69	2615'	Brown Dolomite	103' x 20' fenced/gated area with wellhead and flow meter house. Located in Alibates National Monument Area. Wellhead is painted tan. Ground Elevation: 2,966 feet Total pad surface disturbance: 0.61 acres
4	Bivins A-49	Unknown	2750'	Brown Dolomite	105' x 20' fenced/gated area with wellhead, 150-gallon AST, 2 telemetry systems, drip tank, and flow meter house. Wellhead is painted tan. This road is also shared by an ARCO well located ~ 200 yards northwest. Ground Elevation: 3054 feet Total pad surface disturbance: 0.38 acres
5	Bivins A-53	1/15/73	2669'	Brown Dolomite	103' x 20' fenced/gated area with non-active wellhead, two 150-gallon ASTs, telemetry system, drip tank, compressor, and flow meter house. Wellhead is painted tan and is expected to be decommissioned in September of 2003. Ground Elevation: 2,965.5 feet Total pad surface disturbance: 0.68 acres
6	Bivins A-136	1/15/73	2783'	Brown Dolomite	70' x 20' fenced/gated area with wellhead and flow meter house. Wellhead is painted tan. The elevation of the well development area would be lowered 5 feet. Ground Elevation: 3,084.5 feet Total pad surface disturbance: 0.51 acres
7	Bivins A-166	Unknown	2604'	Brown Dolomite	60' x 20' fenced/gated area with wellhead, 150-gallon AST, telemetry system, drip tank, and flow meter house. Wellhead is painted tan. Ground Elevation: 2,981.5 feet Total pad surface disturbance: 0.77 acres
8	Fee A-2	Unknown	2900'	Brown Dolomite	72' x 20' fenced/gated area with non-active wellhead. Wellhead is painted tan. Ground Elevation: 3146 feet Total pad surface disturbance: 0.77
9	Masterson A-9	Unknown	1925'	Brown Dolomite	Located near a campground. 102' x 20' fenced/gated area with wellhead, 150-gallon AST, telemetry system, drip tank, compressor, and flow meter house. Wellhead is painted tan. Ground Elevation: 2993 feet Total pad surface disturbance: 0.35 acres

	Well Name	Completion Date	Total Depth	Producing Zone	Description of Operations
10	Masterson B-3	1/7/69	2280'	Brown Dolomite	20' x 10' fenced area with wellhead. Wellhead is painted tan. Ground Elevation: 3232 Total pad surface disturbance: 0.51.
11	Masterson B-11	2/12/68	2243'	Brown Dolomite	100' x 20' fenced/gated area with wellhead, drip tank, and flow meter house. Wellhead is painted tan. Utility pole in southern-most portion of new well development area will be relocated. Ground Elevation: 3,257 feet Total pad surface disturbance: 0.87
12	Masterson B-13	9/17/70	1927'	Brown Dolomite	55' x 20' fenced/gated area with wellhead, 150-gallon gasoline AST, 300-gallon engine oil AST, 25-gallon lube oil AST, telemetry system, drip tank, compressor, and flow meter house. Well area would not be developed, just grass mowed and ground leveled. Wellhead is painted tan. Ground Elevation: 2,942 feet Total pad surface disturbance: 0.25
13	Masterson B-20	Unknown	1908'	Brown Dolomite	70' x 20' fenced/gated area with wellhead, 300-gallon gasoline AST, telemetry system, drip tank, compressor, and flow meter house. Wellhead is painted tan. Ground Elevation: 3,024 feet Total pad surface disturbance: 0.51 acres
14	Masterson B-23	8/19/70	1990'	Brown Dolomite	20' x 20' fenced/gated area with wellhead. Wellhead is painted tan. Ground Elevation: 2,937 feet Total pad surface disturbance: 0.77 acres
15	Masterson B-25	1/2/74	1995'	Brown Dolomite	20' x 20' fenced/gated area with wellhead. Wellhead is painted tan. Ground Elevation: 2,939 feet Total pad surface disturbance: 0.22 acres
16	Masterson B-26	1/2/74	2637'	Brown Dolomite	100' x 20' fenced/gated area with wellhead and flow meter house. Located in hunting area. Wellhead is painted tan. Ground Elevation: 2,942 feet Total pad surface disturbance: 0.42 acres
17	Masterson B-31	Unknown	2761'	Brown Dolomite	Well is on the road. 100' x 20' fenced/gated area with wellhead, drip tank, in-line compressor and flow meter house. Located in hunting area. Wellhead is painted tan. Ground Elevation: 2,970 feet Total pad surface disturbance: 0.44 acres
18	Masterson B-51	Unknown	2764'	Brown Dolomite	65' x 20' fenced/gated area with wellhead and flow meter house. Compressor, 150-gallon AST, and drip tank are approximately 20 yards further west of wellhead. Wellhead is painted tan. Ground Elevation: 3,064 feet Total pad surface disturbance: 0.44 acres
19	Masterson B-73	Unknown	2762'	Brown Dolomite	70' x 20' fenced/gated area with wellhead, drip tank, telemetry system, 150-gallon AST, and flow meter house. Wellhead is painted tan. Ground Elevation: 3,060 feet Total pad surface disturbance: 0.51 acres

	Well Name	Completion Date	Total Depth	Producing Zone	Description of Operations
20	Masterson B-80	1/31/58	2494'	Brown Dolomite	70' x 20' fenced/gated area with wellhead, and flow meter house. Approximately 30 ft. north of fence, the sloping ridge would be filled in with surrounding soil for the new well development area. Located in hunting area. Wellhead is painted tan. Ground Elevation: 3,005 feet Total pad surface disturbance: 0.51 acres
21	Masterson B-93	Unknown	2740'	Brown Dolomite	50' x 20' fenced/gated area with wellhead, in-line compressor and flow meter house. Wellhead is painted tan. Ground Elevation: 3,242 feet Total pad surface disturbance: 0.51 acres
22	Sneed E-1	Unknown	2946'	Brown Dolomite	290' x 80' fenced/gated area with wellhead and flow meter house. Compressor, 150-gallon AST, telemetry system and drip tank are shared by Sneed 1-R also located within the fence and on the south side. Wellhead is painted tan. Located in hunting area. Ground Elevation: 3,072 feet Total pad surface disturbance: 0.51 acres
23	Warrick A-3	8/7/70	2545	Brown Dolomite	50' x 20' fenced/gated area with wellhead, compressor with building, 9-barrel tank, underground drip, and flow meter Wellhead is painted tan. Ground Elevation: 3,025 feet Total pad surface disturbance: 0.51 acres
24	Warrick A-5	12/13/68	2865	Brown Dolomite	50' x 20' fenced/gated area with wellhead and flow meter Wellhead is painted tan. Ground Elevation: 3,165 feet Total pad surface disturbance: 0.49 acres
25	Bivins 6R	8/12/61	1769	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 3,189 feet Total pad surface disturbance: 0.51 acres
26	Bivins 11R	8/23/62	1730	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 3,182 feet Total pad surface disturbance: 0.51 acres
27	Bivins 20R	9/23/66	1750	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 3,190 feet Total pad surface disturbance: 0.70 acres
28	Bivins 75R	7/11/75	1746	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 3,099 feet Total pad surface disturbance: 0.36 acres
29	Bivins 85R	10/7/73	1748	Red Cave	50' x 20' fenced/gated area with wellhead and meter run . Wellhead is painted tan. Ground Elevation: 3,141 feet Total pad surface disturbance: 0.63 acres
30	Bivins A-160R	10/6/60	2780	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 3,077 feet Total pad surface disturbance: 0.77 acres

	Well Name	Completion Date	Total Depth	Producing Zone	Description of Operations
31	Fee 3R	7/1/65	1740	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 3,126 feet Total pad surface disturbance: 0.22 acres
32	Masterson 5R	10/5/60	1566	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 2,967 feet Total pad surface disturbance: 0.77 acres
33	Masterson 58R	8/30/72	1630	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 2,991 feet Total pad surface disturbance: 0.33 acres
34	Masterson 68R	7/17/73	1610	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 2,990 feet Total pad surface disturbance: 0.68 acres
35	Masterson 85R	10/7/73	1645	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 2,967 feet Total pad surface disturbance: 0.63 acres
36	Masterson B-100R	10/12/73	1812	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 3,299 feet Total pad surface disturbance: 0.21 acres
37	Sneed 1R	9/27/62	1840	Red Cave	290' x 80' fenced/gated area with wellhead and flow meter house. Compressor, 150-gallon AST, telemetry system and drip tank are shared by Sneed 1-E also located within the fence and on the north side. Wellhead is painted tan. Ground Elevation: 3,074 feet Total pad surface disturbance: 0.51 acres
38	Warrick 3R	8/31/62	1642	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 3,190 feet Total pad surface disturbance: 0.44 acres
39	Warrick 4R	11/19/63	1758	Red Cave	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted white. Ground Elevation: 3,157 feet Total pad surface disturbance: 0.24 acres
40	Bivins A-206	5/22/98	2900	Brown Dolomite	50' x 20' fenced/gated area with wellhead and meter run. Wellhead is painted tan. Ground Elevation: 3,186 feet Total pad surface disturbance: 0.77 acres
41	Bivins A-208	2/15/98	2900	Brown Dolomite	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 3016 feet Total pad surface disturbance: 0.51 acres
42	Bivins A-160		2761	Brown Dolomite	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 3,077 feet Total pad surface disturbance: 0.77 acres
43	Bivins A-165		2560	Brown Dolomite	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 3124 feet Total pad surface disturbance: 1.1 acres
44	Bivins A-166		2981	Brown Dolomite	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 2604 feet Total pad surface disturbance: 0.51 acres

	Well Name	Completion Date	Total Depth	Producing Zone	Description of Operations
45	Masterson B-29		1963	Brown Dolomite	50' x 20' fenced/gated area with wellhead and meter run Wellhead is painted tan. Ground Elevation: 2980 feet Total pad surface disturbance: 0.51 acres
<b>Total Pad Surface Disturbance</b>					<b>24.41 Acres</b>

<sup>1</sup> Acreage of operations areas are derived from an NPS inventory and field inspection conducted in April and May 2002.

Pioneer operates 63 pipelines totaling 36.93 miles within the park boundary. Table 5 lists the pipelines and their associated operating pressures. Average product flow rate varies throughout the park depending on the pipelines. Table 5 shows the length, approximate flows in thousand cubic feet per day (MCFD) of natural gas and operating pressures for the pipelines throughout Lake Meredith National Recreation Area.

**Table 5: List of Pipelines**

Pipeline Name	Length (feet)	Flow (MCFD )	Operating Pressure (psia)	Nominal Size (inches)	MAO P (psig)	Well(s) Connected To
F-1	13,000	12000	150	16	788	PFC 6 discharge
F-1	13,000	12000	150	22	710	PFC 6 discharge
F-1006	100	85	6-10	4	1736	Sneed 1R
F-1008	4,700	440	5-7	12	988	Warrick 3R, Bivins A-206, Bivins 20R, Bivins A-165, Bivins A-208, Bivins A-46, McBride 1R and A-2 split
F-1008L	4,700	320	5-7	12	988	Warrick 3R, Bivins A-206, Bivins 20R, Bivins A-165, Bivins A-208, Bivins A-46, McBride 1R and A-2 split
F-1009	1000	105	8-10	6	1198	Warrick 3R, Bivins A-206, Bivins 20R
F-1011	5,500	130	6-8	8	1461	Bivins A-165, Bivins A-208 split
F-1011L	5,000	410	6-8	12	870	Bivins A-165, Bivins A-208 split
F-1012	1,000	120-150	6-7	6	2111	Masterson B-93
F-1013	200	375	6-25	4	1400	Bivins A-166
F-1021	200	50	5-6	4	2106	Warrick 4R
F-1047	700	30-35	6	4	1736	Fee 3R
F-1060	100	45	8-10	4	2106	Bivins 20R
F-1174	2,750	28	10-12	4	1400	Masterson 68R, Masterson 58R
F-1193	3,000	8	10-12	4	1400	Masterson 68R
F-1208	200	30	10-30	4	1400	Masterson B-100R
F-1230	100	25	15-20	4	1400	Masterson 85R
F-1245	100	100	10	4	2106	Bivins 75R
F-1415	600	90	8-10	6	1198	Bivins A-208
F-1417	200	65	8-10	4	1400	Bivins A-206
F-16	6,500	6400	25	16	788	PFC 28 discharge
F-28	3,000	300	10	8	1461	Masterson B-24, 95R, B-102
F-28	8,000	430-460	10	10	1172	Masterson B-23 etc
F-28	14,000	1500	17	12	1304	Masterson B-20 etc
F-28	14,000	1200	15	12	1304	Masterson B-13 etc split
F-28L	10,000	850	15	12	751	Masterson B-73, Masterson B-13, Masterson B-11 Etc
F-32	3,000	300	5-7	12	988	Myriad
F-32L	3,500	4000	25	20	554	Myriad
F-39	3,000	210-230	10-12	6	1430	Masterson 68R, Masterson 58R, Masterson B-29, Masterson B-26
F-53	2,500	440	25-30	8	1461	Bivins A-49, Bivins A-166, Bivins A-53 split
F-53L	2,500	450	25-30	8	1271	Bivins A-49, Bivins A-166, Bivins A-53 split
F-552	1,500	180-215	20-25	6	1198	Bivins H-1, Bivins 75R
F-596	400	200-250	3-5	6	1883	Bivins A-29
F-608	2500	120	6-8	4	1400	Masterson B-11
F-610	200	140	5-6	4	1400	Masterson B-13
F-612	2000	175-200	15	6	1430	Masterson A-9
F-62	6500	140	12-14	6	1902	Bivins A-136

F-635	4,000	50-60	20	4	2106	Warrick A-3
F-644	3,000	115	8-10	4	2106	Warrick 3R, Bivins A-206, Bivins 20R
F-646	3,300	0	6-8	4	2106	Bivins A-46 split
F-646L	3,300	0	6-8	6	1198	Bivins A-46 split
F-650	7,700	565-615	30	6	1902	Bivins A-49, Bivins A-166
F-650L	2,700	625-690	25	8	1271	Bivins A-166, Bivins A-53
F-652	2000	250-275	30	6	1902	Bivins A-53
F-709	2500	290-320	17	6	1655	Masterson B-20
F-727	500	140-150	8-15	4	1400	Masterson B-25
F-728	3000	130-160	10	6	5242	Masterson B-23
F-731	200	485	15-20	6	1198	Masterson 85R, Masterson B-117, Masterson B-37, Masterson B-100R
F-734	1,000	160	10-13	4	1400	Masterson B-26
F-735	3,000	68	10-12	4	2632	Masterson 68R, Masterson 58R, Masterson B-29
F-736	100	200-220	15-30	4	1400	Masterson B-31
F-749	500	30	15	4	1400	Masterson B-37 (well not on Park)
F-788	750	115-140	5	6	1430	Warrick 4R, Warrick A-5
F-870	100	140	12-14	4	1400	Bivins A-136
F-879	8000	160-190	6	6	1883	Sneed E-1, Sneed 1R
F-880	100	120	5-7	4	1736	Sneed E-1
F-909	5500	175-200	17	6	1655	Masterson B-73
F-912	3,800	150-175	10	4	1400	Masterson B-80
F-947	500	240	15-20	6	1198	Masterson B-31, Masterson 5R
F-955	200	10	30	4	2106	Bivins A-160R
F-972	400	0	25	4	2106	Bivins 6R
F-993	100	65-80	20	6	1198	Bivins 11R, Warrick A-3
F-999	100	0	8-10	4	2106	Warrick 3R

**Total Length of**

**Pipeline (feet)** 195,600

Notes: psig-pounds per square inch gauge. MCFD-thousand cubic feet per day MAOP-maximum allowable operating pressure. psia-pounds per square inch absolute pressure

## Drip Stations

Pioneer operates 133 drip stations within the park boundary. Twelve of the drip stations are located at the wells (one at Masterson B-20, B-13, A-9, B-73, B-31, B-51, B-11, Bivins H-1, Bivins A-49, Bivins A-166, and one shared at the Sneed E-1 and 1-R wells). All 45 Pioneer natural gas wells produce small amounts of water, which are collected at the “drip” prior to entering the meterhouse.

Drip stations are low points in the flowline where the heavier produced waters settle out, while natural gas products continue to move down the line. A truck routinely pumps the liquid from the drip location. The gas products are carried through the gathering line system under pressure from the compressors. Drip stations prevent flowline ruptures and release of natural gas products as a result of freezing.

## DESCRIPTION OF ACCESS ROAD MAINTENANCE

Pioneer uses and maintains 35.42 miles (85.86 acres) of access roads within the park boundary. Lease roads used to access the natural gas wells would continue to be maintained by Pioneer. Under Alternative A, Pioneer will maintain its access roads in accordance with NPS Nonfederal Oil and Gas Rights Regulations 36 CFR 9B 9.50 and the ratified Plan of Operations. Pioneer's access roads are depicted in Figures 1 through 5.

Currently direct surface disturbance including wellpads, access roads, and pipelines is 114.72 acres. The breakdown of the disturbances is shown below.

Type of Disturbance	Existing Operations Disturbed Area (Miles)	Existing Operations Acreage Disturbed (Acres)
Wellpads		24.41
Access Roads	35.42 miles	85.86
Pipelines	36.93 miles	4.45
<b>Total Acreage Disturbed</b>		<b>114.72</b>

*Note: Acres listed under existing operations for Access Roads are based on a 20-foot wide road.  
Acres listed for pipeline disturbance are based on 25 foot wide average corridor.*

## DESCRIPTION OF RECLAMATION PLAN

At the completion of production operations, the wells would be plugged and all aboveground structures, equipment, and other man-made debris resulting from operations would be removed; and any contaminating substances would be removed or neutralized [36 CFR 9.39 (a)(2)]. During annual monitoring efforts, undesirable species would be controlled either by herbicide application or hand/tool removal, as approved by the NPS. Reclamation would not be acceptable unless it provides for the safe movement of native wildlife, the reestablishment of native vegetative communities, the normal flow of surface and reasonable flow of subsurface waters, and the return of the areas to a condition which does not jeopardize visitor safety or public use of the unit.

## MITIGATION

In order to reduce the effects to park resources and values, the mitigating measures described in Table 6 would be applied to the oil and gas operations under Alternative A. These are based on the NPS Nonfederal Oil and Gas Rights Regulations 36 CFR 9B for reclamation requirements, operating standards and other information, and Pioneer's ratified Plan of Operations.

**Table 6: Mitigation Measures under Alternative A, No Action**

Number	Mitigation Measures under Alternative A, No Action	Resources and Values Affected
1	The operator shall protect all survey monuments, witness corners, reference monuments and bearing trees against destruction, obliteration, or damage from operations and shall be responsible for the reestablishment, restoration, or referencing of any monuments, corners and bearing trees which are destroyed, obliterated, or damaged by such operations.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety
2	Pioneer has included a spill response plan (36 CFR 9.41(f) and 9.45). Pioneer would report to the park within 24 hours of any release to the ground of 5 gallons or more of oil or contaminating substances, as defined by 36 CFR 9.31(n). Pioneer would also report any discharge into a body of water to the EPA.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety
3	Operations areas would be fenced and gated and signed (36 CFR 9.41(e)) and (36 CFR 9.41(d)).	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety
4	The operator shall carry on all operations and maintain the site at all times in a safe and workmanlike manner, having due regard for the preservation of the environment of the unit. The operator shall take reasonable steps to prevent and shall remove accumulations of oil or other materials deemed to be fire hazards from the vicinity of well locations and lease tanks, and shall remove from the property or store in an orderly manner all scrap or other materials not in use.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, human health and safety
5	The operator shall mark each and every operating derrick or well in a conspicuous place with his name or the name of the owner, and the number and location of the well, and shall take all necessary means and precautions to preserve these markings.	visitor use and experience, human health and safety
6	If shut-in of the well occurs when drilling or production operations are suspended for 24 hours or more, but less than 30 days, the wells shall be shut in by closing wellhead valves or blowout prevention equipment.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety
7	If production operations are suspended for 30 days or more, a suitable plug or other fittings acceptable to the Superintendent shall be used to close the wells.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety
8	Pioneer will be held fully accountable for their contractor's or subcontractor's compliance with the requirements of the approved Plan of Operations.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety
9	To prevent accumulation of oil and other materials deemed to be fire hazards, all flammable liquids (i.e., condensate, compressor oil, etc.) would be stored in steel or fiberglass tanks and contained inside the firewall or a berm at the central facility. All materials not necessary for the operation of the well would be removed. Any surplus or emergency materials or supplies that need to be kept at the well site would be stored at the central facility in a locked storage shed or parts box.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety
10	Pioneer has included a <i>Contaminating or Toxic Substance Spill Control Plan</i> in the Plan of Operations to describe actions to be performed in the event of an oil spill, brine spill, release of drilling fluids, blow-out, or release of any toxic substance.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety

Number	Mitigation Measures under Alternative A, No Action	Resources and Values Affected
11	Each well would be plugged and abandoned within one year after cessation of production and a determination by Pioneer that commercial production cannot be reestablished. As soon as possible, and no later than 6 months after determining that production would not be reestablished, Pioneer would plug the well(s) and proceed with reclamation (36 CFR 9.39(a) and (b)).	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety
12	Wells would be plugged in accordance with NPS plugging procedures (as per Federal Onshore Oil and Gas Order #2 and state requirements). Prior to future plug and abandonment of an exhausted producing well, Pioneer will submit a detailed plugging procedure to the NPS for approval. Once a procedure is approved, Pioneer may then plug and abandon the exhausted producing well. Upon completion of any plugging operations, Pioneer will provide the Superintendent with a copy of State of Texas Form W-3, Plugging Record, or its successor form.	Groundwater
13	Well plugging will be performed according to NPS standards at the time of abandonment. If different than provided for in this plan, the NPS shall notify Pioneer of necessary changes to the plan in accordance with 36 CFR 9.40, Supplementation or Revision of a Plan of Operations.	Groundwater
14	Production from the natural gas wells would be monitored remotely on a daily basis utilizing electronic metering equipment at the meter-run facility that sends pertinent flow data to the district office via a cellular signal. Any interruption in flow would alert Pioneer of a possible leak in the flowline.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety
15	Any soil contaminated by oil, brine, chemicals, or other substances that would inhibit reestablishment of natural vegetation would be removed from the park and replaced with clean fill.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety
16	After reseeding, the area would be monitored to assess revegetation progress. Revegetation would be considered successful when plant coverage is uniform over the site to the NPS approval. If successful revegetation does not occur after a period of two years, Pioneer would take corrective actions acceptable to the NPS to ensure the reclamation standards of 36 CFR § 9.39 are achieved.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety
17	Prior to any workover or plugging operations, Pioneer would notify the park Superintendent in writing and would provide the park Superintendent with verbal notification within at least 48 hours prior to the start of activities.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety
18	Fresh water needed for operations, including workovers and plugging operations, would be delivered by truck and obtained from sources outside the park (36 CFR 9.35).	Municipal water supply
19	Pioneer would paint well head and associated equipment and support buildings a sand color during next painting cycle.	Visual quality
20	The operator shall take technologically feasible precautions to prevent accidents and fires, shall notify the Superintendent within 24 hours of all accidents involving serious personal injury or death, or fires on the site, and shall submit a full written report thereon within ninety (90) days.	human health and safety
21	Where the surface estate of the site is owned by the United States, the operator shall not, without written authorization of the Superintendent, injure, alter destroy, or collect any site, structure, object, or other value of historical, archeological or other cultural scientific importance in violation of the Antiquities Act (16 U.S.C. 431-433).	Buried cultural and paleontological resources
22	Once approved operations have commenced, Pioneer shall immediately bring to the attention of the Superintendent any cultural or scientific resource encountered that might be altered or destroyed by his operation and shall leave such discovery intact until told to proceed by the Superintendent. The Superintendent will evaluate the discoveries brought to his attention, and will determine within ten (10) working days what action will be taken with respect to such discoveries.	Buried cultural and paleontological resources
23	Surface reclamation will be performed according to NPS standards at the time of abandonment. If different than provided for in this plan, the NPS shall notify Pioneer of necessary changes to the plan in accordance with 36 CFR 9.40 Supplementation or Revision of a Plan of Operations.	Soil, surface and ground water, floodplains
24	An affidavit by Pioneer to operate and comply with all applicable Federal, State, and local laws and regulations	Soil, surface and ground water, floodplains, air quality, vegetation, fish and wildlife, visitor use and experience, human health and safety

Figure 1: Lake Meredith National Recreation Area and Location of 45 Natural Gas Wells

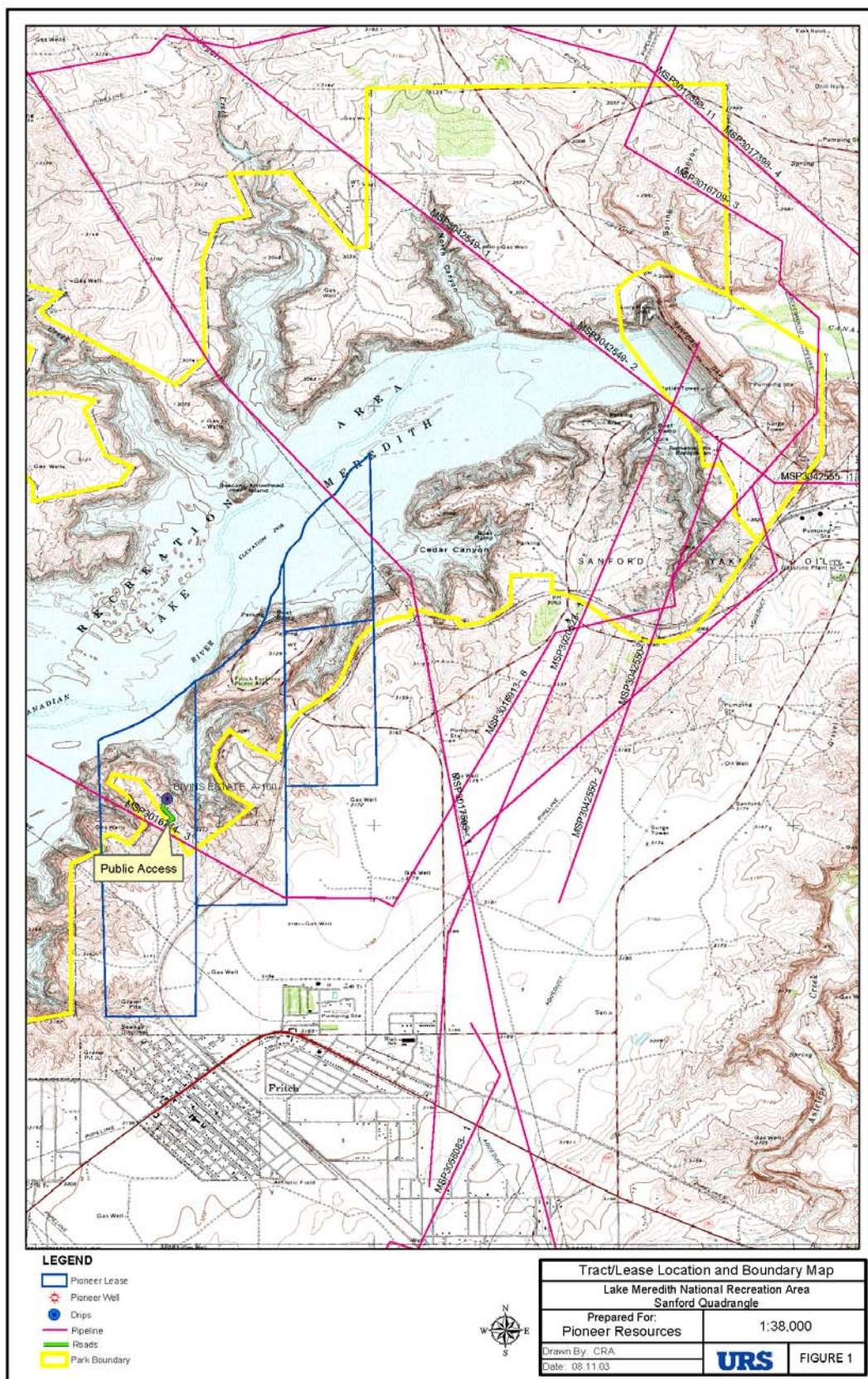


Figure 2: Lake Meredith National Recreation Area and Location of 45 Natural Gas Wells

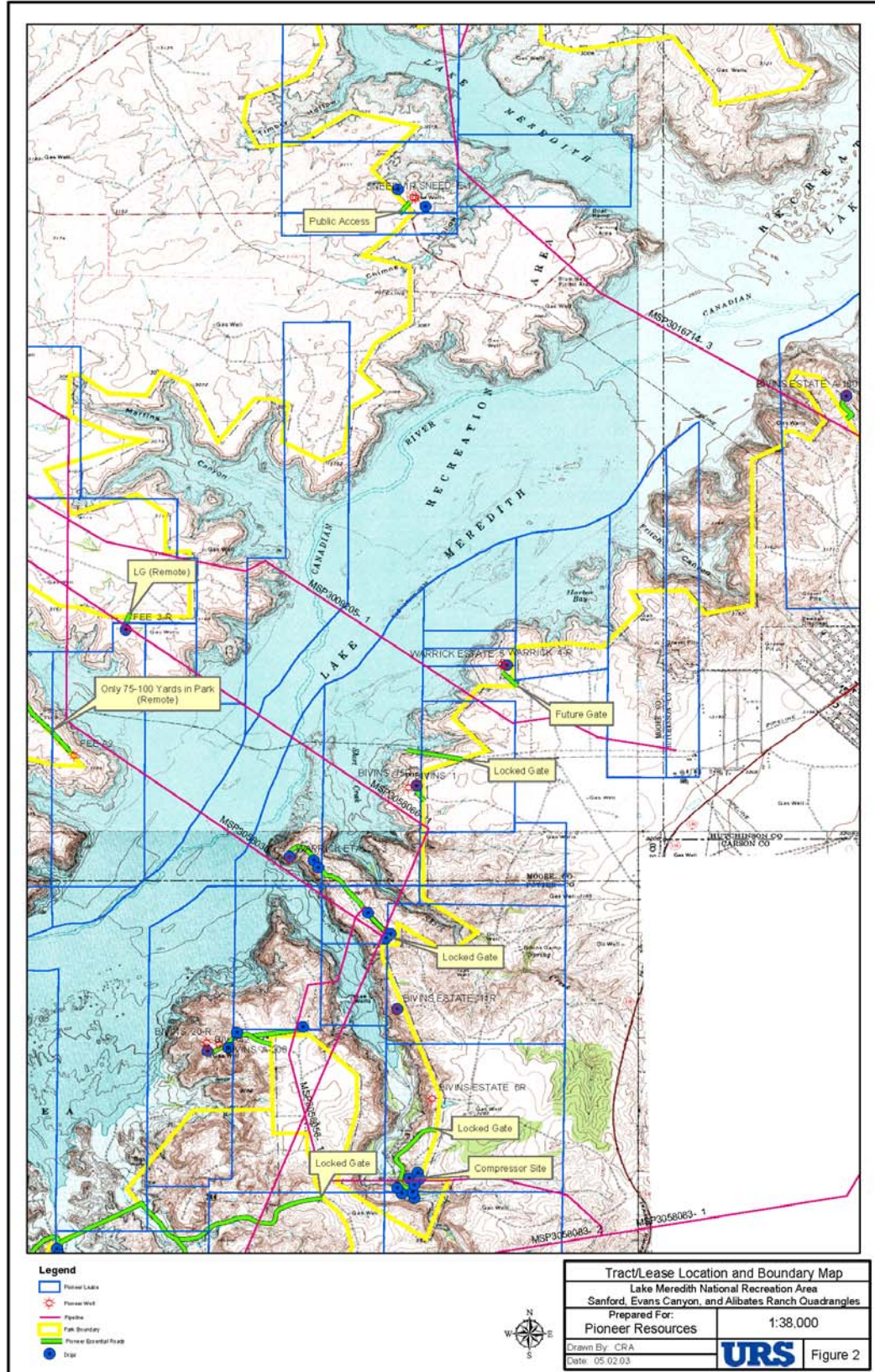


Figure 3: Lake Meredith National Recreation Area and Location of 45 Natural Gas Wells:

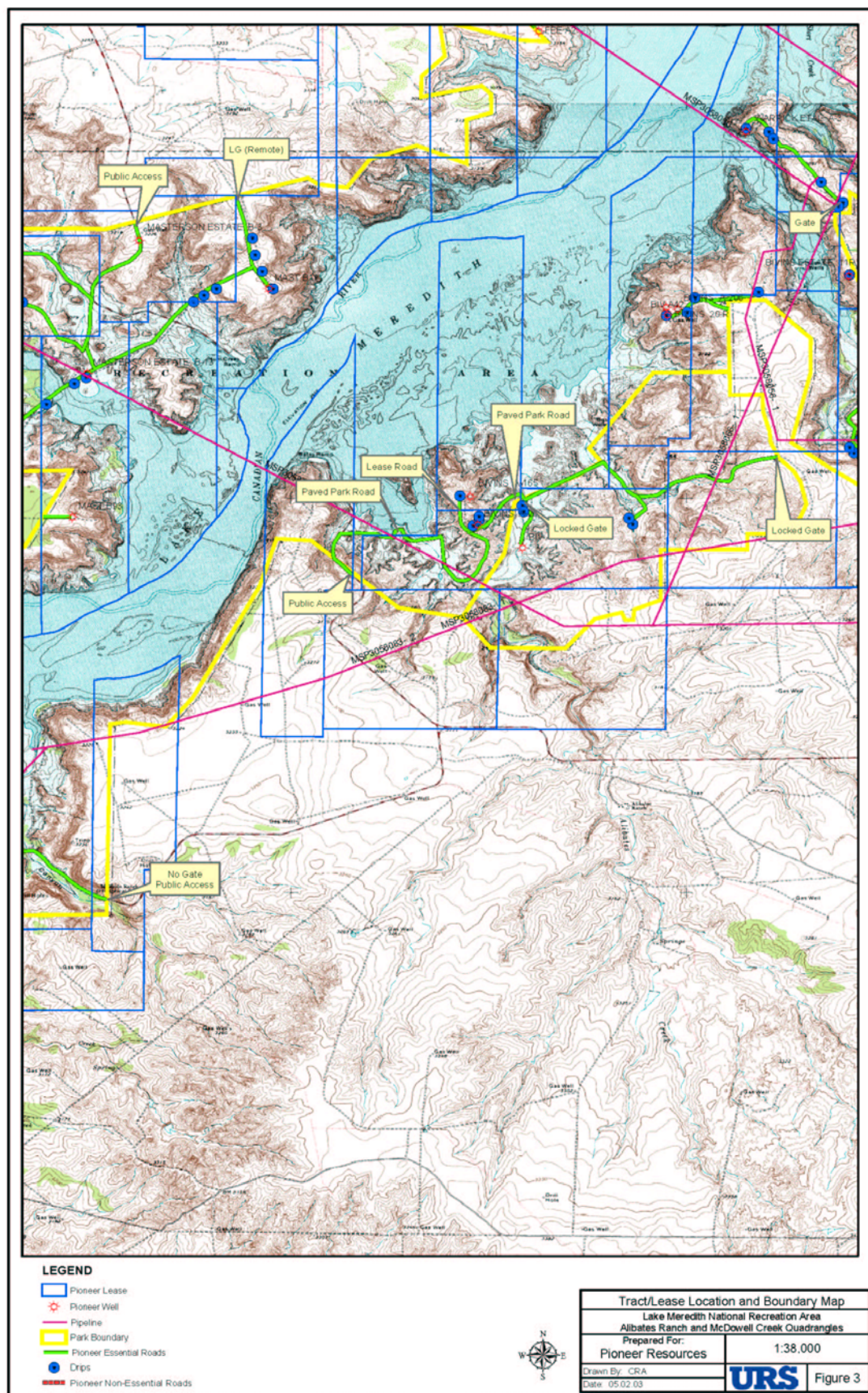


Figure 4: Lake Meredith National Recreation Area and Location of 45 Natural Gas Wells

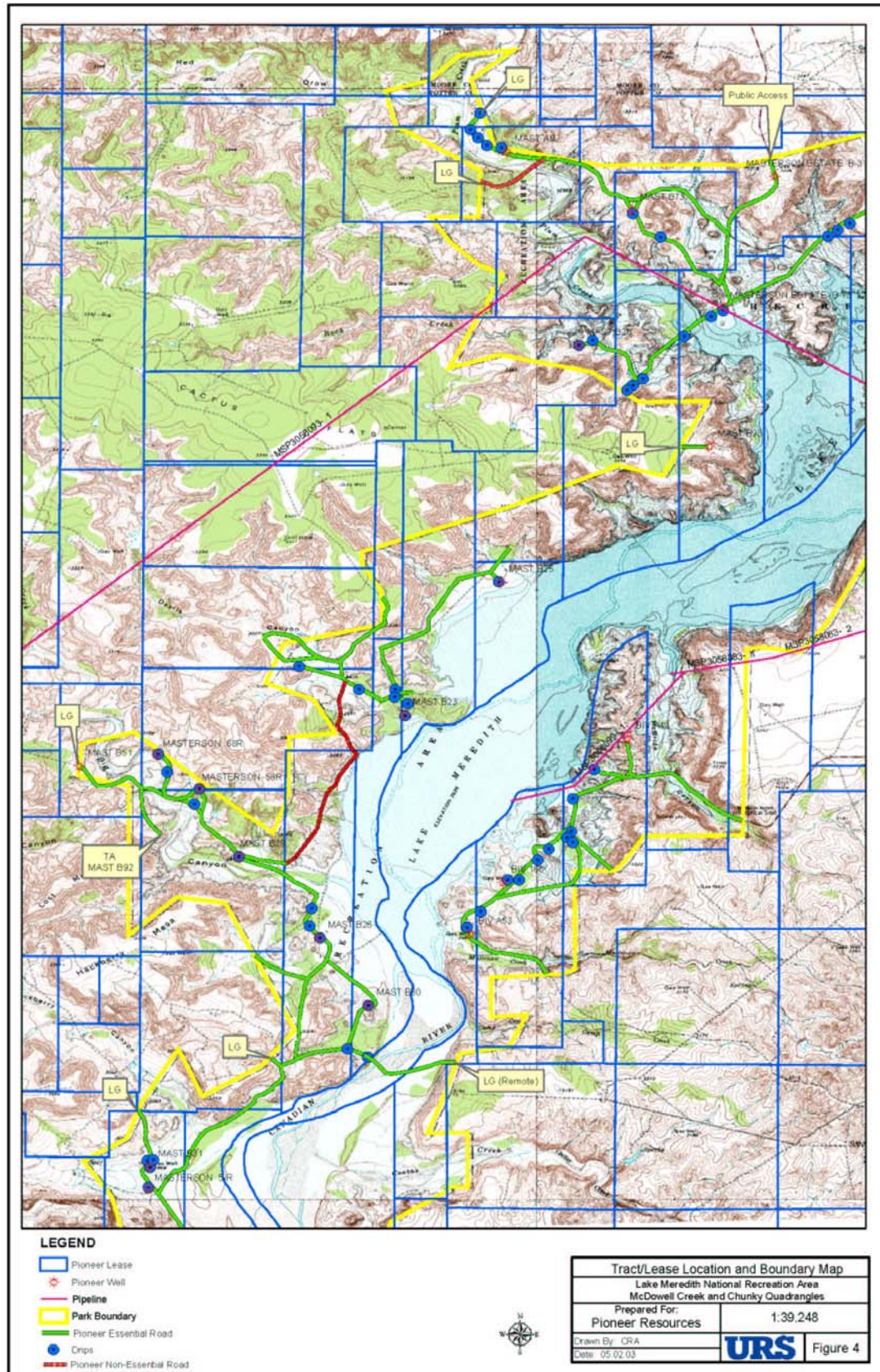
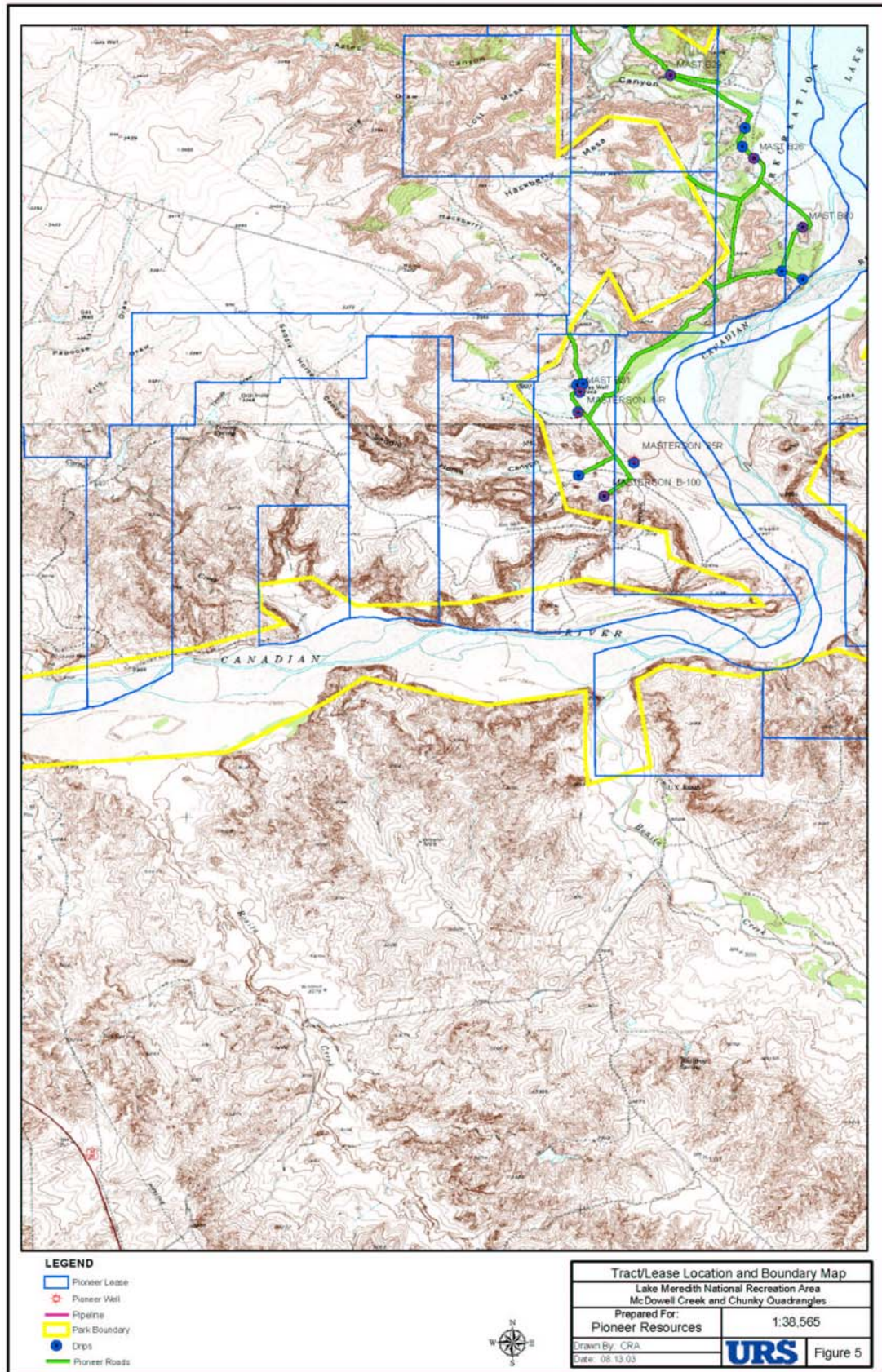


Figure 5: Lake Meredith National Recreation Area and Location of 45 Natural Gas Wells



### 2.1.2. Alternative B, (Proposal), Plan of Operations As Submitted By Pioneer

Under Alternative B, the NPS would issue a permit to Pioneer by approving the Plan of Operations, as submitted, for continued operation of 45 natural gas wells and associated pipelines and access roads, re-entry of 22 of the 45 natural gas wells, and drilling of one new well (Bivins H-2) and re-entry of the well at a later date should the well be productive. The Plan of Operations, as submitted, provides for increased protection and prevention of adverse impacts to park resources and values. The plan also requests an exemption to locate a well pad within the Dolomite Caprock Special Management Area (SMA) based on these measures. Mitigation for this alternative is provided in Table 8.

#### DESCRIPTION OF RE-ENTRY WELLS

The re-entry of the 22 natural gas wells would occur at existing locations. The wells were drilled 5 to 41 years ago. Pioneer anticipates the life of the wells to further continue 10 to 25 years. The drilling of the new well (Bivins H-2) would be at a new location; however, this well is also proposed as a re-entry well at a later date. Pioneer proposes additional surface disturbance (well pad expansion) for 22 of the natural gas wells so that the well pad would be expanded to an approximately 1 acre area.

Table 7 provides a list of the wells scheduled for re-entry and the proposed new well.

**Table 7: List of 22 Re-Entry Wells and 1 Proposed New Well**

	Well Name	Total Depth	Producing Zone	Description of Operations
1	Bivins A-29	2490'	Brown Dolomite	Ground Elevation: 3181 feet Total pad surface disturbance: 0.24 acres The following wells are located within a mile radius of this well: Masterson B-111, Bivins 186-R, Bivins 1, Bivins A-29, & Fee A-2.
2	Bivins A-42	2348'	Brown Dolomite	Ground Elevation: 3189 feet Total pad surface disturbance: 0.95 acres The following well is located within a one-mile radius: Bivins A-208.
3	Bivins A-46	2615'	Brown Dolomite	Ground Elevation: 2966 feet Total pad surface disturbance: 0.61 acres The following wells are located within a one-mile radius: Bivins A-208, Bivins A-157, Bivins A-165, Bivins A-167
4	Bivins A-49	2750'	Brown Dolomite	Ground Elevation: 3054 feet Total pad surface disturbance: 0.38 acres Bivins A-29 is located within a one-mile radius of this well.
5	Bivins A-53	2669'	Brown Dolomite	Ground Elevation: 2965.5 feet Total pad surface disturbance: 0.68 acres Four wells are within one mile of the site: Bivins A-133, Bivins A-166, Masterson B-80, and Masterson B-26.
6	Bivins A-136	2783'	Brown Dolomite	Ground Elevation: 3084.5 feet Total pad surface disturbance: 0.51 acres Bivins A-135 is located within a one-mile radius of this well.
7	Bivins A-166	2604'	Brown Dolomite	Ground Elevation: 2981.5 feet Total pad surface disturbance: 0.77 acres Four wells are within a one-mile radius of this well: Bivins A-79, Bivins A-53, Bivins A-74, and Masterson B-26.

	Well Name	Total Depth	Producing Zone	Description of Operations
8	Fee A-2	2900'	Brown Dolomite	Ground Elevation: 3146 feet Total pad surface disturbance: 0.77 Five wells are within a one-mile radius of this well: Bivins 1, Bivins A-186R, Fee A-4, Fee A-3, and Fee-53.
9	Masterson A-9	1925'	Brown Dolomite	Ground Elevation: 2993 feet Total pad surface disturbance: 0.35 acres Three wells are within a one-mile radius of this well: Masterson B-19, Masterson B-43, and Masterson B-73.
10	Masterson B-3	2280'	Brown Dolomite	Ground Elevation: 3232 Total pad surface disturbance: 0.51 Three wells are within a one-mile radius of this well: Masterson B-11, Masterson B-73, and Masterson B-116.
11	Masterson B-11	2243'	Brown Dolomite	Ground Elevation: 3257 feet Total pad surface disturbance: 0.87 Three wells are within a one-mile radius of this well: Masterson B-3, Masterson B-105, and Masterson B-116.
12	Masterson B-13	1927'	Brown Dolomite	Ground Elevation: 2942 feet Total pad surface disturbance: 0.25 Two wells are within a one-mile radius of this well: Masterson B-20 and Masterson B-93.
13	Masterson B-20	1908'	Brown Dolomite	Ground Elevation: 3024 feet Total pad surface disturbance: 0.51 acres Masterson B-43 is located within a one-mile radius of this well.
14	Masterson B-23	1990'	Brown Dolomite	Ground Elevation: 2937 feet Total pad surface disturbance: 0.77 acres Two wells are within a one-mile radius of this well: Masterson B-24 and Masterson B-102.
15	Masterson B-25	1995'	Brown Dolomite	Ground Elevation: 2939 feet Total pad surface disturbance: 0.22 acres Two wells are within a one-mile radius of this well: Masterson B-23 and Masterson B-62.
16	Masterson B-26	2637'	Brown Dolomite	Ground Elevation: 2942 feet Total pad surface disturbance: 0.42 acres Masterson B-29 is located within a mile radius of this well.
17	Masterson B-31	2761'	Brown Dolomite	Ground Elevation: 2970 feet Total pad surface disturbance: 0.44 acres Four wells are within a one-mile radius of this well: Masterson N-1, Masterson B-32, Masterson B-37, and Masterson B-58R.
18	Masterson B-51	2764'	Brown Dolomite	Ground Elevation: 3064 feet Total pad surface disturbance: 0.44 acres One well is within a one-mile radius of this well: Masterson B-29.
19	Masterson B-73	2762'	Brown Dolomite	Ground Elevation: 3060 feet Total pad surface disturbance: 0.51 acres Three wells are within a one-mile radius of this well: Masterson B-3, Masterson B-13, and Masterson A-9.
20	Masterson B-80	2494'	Brown Dolomite	Ground Elevation: 3005 feet Total pad surface disturbance: 0.51 acres Five wells are within a one-mile radius of this well: Bivins A-53, Bivins A-168, Masterson B-26, Masterson B-27, and Masterson B-29.
21	Masterson B-93	2740'	Brown Dolomite	Ground Elevation: 3242 feet Total pad surface disturbance: 0.51 acres Five wells are within a one mile radius of this well: Bivins B-47, Masterson B-110, Masterson B-14, Masterson B-20, and Masterson B-13.
22	Sneed E-1	2946'	Brown Dolomite	Ground Elevation: 3072 feet Total pad surface disturbance: 0.35 acres No other wells are located within a one-mile radius.

	Well Name	Total Depth	Producing Zone	Description of Operations
23	Bivins H-2	Estimated 2700"	Brown Dolomite	Ground Elevation 3,116. Anticipated pad surface disturbance: 1.0 acres Five wells are located within a one-mile radius of this well: Bivins A-168, Bivins-44, Warrick A-5, Warrick A-3, and Bivins H-1

<sup>1</sup> Acreage of operations areas are derived from an NPS inventory and field inspection conducted in April and May 2002. It should be noted that Bivins H-2 will also be re-entered at a later date.

## GENERAL DESCRIPTION OF CONSTRUCTION AND DRILLING ACTIVITIES UNDER ALTERNATIVE B

In general, construction of a new well pad consists of clearing vegetation, grading the site, covering the pad with an impermeable liner (20 mil), and constructing a 24-inch berm around the outer perimeter of the drilling pad. Conventional foundation construction techniques would be used to construct the drill site. One bulldozer and one maintainer would be used to level the roadbed and drilling pad. After leveling, a lease crew would cover the pad with a liner. Dump trucks would be used to place a base layer on the well pad if needed. The base layer would be spread with a bulldozer and leveled with a maintainer. A compactor and a water truck would be used to water the road and pad and compact the base layer. A berm would be constructed around the perimeter of the pad area for containment. Berms would also be constructed around the diesel tanks for containment.

During site preparation, Pioneer would cut and store vegetation prior to ground disturbing activities for use in later mulching and native seeding for reclamation/revegetation. A fence would be placed around the perimeter of the location prior to when the pad is constructed to deter unauthorized persons from entering the operations area during drilling and completion operations. During re-entry drilling operations, all equipment, machinery, and living quarters would be placed within the approximately 1-acre pad area. During construction, drilling, and production, all vehicles would enter the park at various entrances, depending on the well location. Once inside the park boundaries, traffic would be limited to the existing access roads that lead to the proposed wells. The facility layout for the re-entry wells and for the new well (Bivins H-2) are shown on Figures 6 and 7.

The isolated work areas would remain virtually untainted by artificial light sources. Drilling the wells, however, would require work around-the-clock. Therefore, artificial lighting must be brought in to facilitate a safe night work environment. Pioneer would strive to maintain a balance between human safety, preservation of the park's night sky, and reduction of impacts to wildlife. To the extent possible, artificial lighting would be directionally focused on the work site, and light bulbs would be recessed.

Should Pioneer's new proposed well (Bivins H-2) prove to be productive, the production facilities would be placed on the existing well pad. By placing the production facilities on the same pad as the well, no additional impacts to previously undisturbed habitats would occur. This pad may also be used for additional drilling of horizontal laterals on Bivins H-2 well, should it be productive.

Location maps for each well site proposed for re-entry and the new well are located in Appendix B in the Plan of Operations. Figures 1 through 5 in this EA depict the well locations on topographic maps. Site drilling facility diagrams are provided in Appendix C of the Plan of Operations.

During drilling activities an estimated 2,500 barrels of fresh water would be required to drill and complete each well. The required fresh water would be trucked to each well site from an available commercial source outside the park.

Under Alternative B, the proposed direct surface disturbance including wellpads and access roads resulting from well pad expansion would be approximately 9.0 acres, for a total direct disturbance of 119.27 acres.

Type of Disturbance	Existing Operations Disturbed Area (Miles)	Existing Operations Acreage Disturbed (Acres)	Proposed Operation Acreage Disturbed (Acres)
Wellpads		24.41	33.41
Access Roads	35.42 miles	85.86	85.86
Pipelines	36.93 miles	4.45	4.45
<b>Total Acreage Disturbed</b>		<b>114.72</b>	<b>123.72</b>

*Note: Acres listed under existing operations for Access Roads are based on a 20 foot wide road.*

## DESCRIPTION OF ACCESS ROAD MAINTENANCE

Pioneer uses and maintains approximately 36 miles (85.86 acres) of access roads within the park boundary. Lease roads used to access the natural gas wells would continue to be maintained by Pioneer. Under Alternative B, Pioneer will maintain its access roads in accordance with Appendix D of the OGMP according to the specifications listed on pages D-2 and D-3 under the heading “Requirements for Siting Constructing Oil and Gas Access Roads”. Pioneer’s access roads are provided on Figures 1 through 5. Below is a brief summary of the requirements of siting and constructing oil and gas access roads under the OGMP.

1. Operators must comply with all applicable federal, state, and local regulatory requirements.
2. Existing oil and gas access roads and park roads shall be used wherever possible to minimize the amount of surface disturbance in the parks. Where feasible, operators are encouraged to share access roads during field development. Roads shall be routed to complement other land uses.
3. Roads should not be sited on steep slopes, rugged topography, where there are highly erodible soils, slumps, debris flows, landslides, or across perennial and ephemeral/intermittent water courses. If there is no alternate access to the operations site, adequate mitigation measures shall be implemented to minimize the potential for increased run-off and erosion on and below the road surface.
4. Roads shall not be sited in Special Management Areas (SMAs) where the No Surface Use stipulation would apply including:
  - Geologic Hazards and Features SMA (where there are filled chimneys with a 250’ setback, and dolomite caprock with a 300’ setback),
  - Paleontological Resources SMA (where there are scientifically significant paleontological resources),
  - Floodplains and Water Resources SMAs, including below the estimated 100-Year Flood Elevation SMA; and Perennial, Intermittent or Ephemeral Watercourses with a 500’ setback.
  - Bird Rookery SMA,
  - Threatened and Endangered Species SMAs including: Arkansas River Shiner Critical Habitat SMA, Bald Eagle Winter Roosting Site SMA, and Black-tailed Prairie Dog Colony SMA,
  - Cultural Resources SMAs, including: Alibates Flint Quarries National Monument SMA, McBride Canyon Cultural Landscape SMA, and Carbon Black Plant SMA, and

- Visitor Use and Administrative Areas SMAs with a 500' to 1,500' setback, including: Information Stations SMA, Day/Overnight Use Areas SMA, Trails SMA, Park and CRMWA Administrative Areas SMA, Sanford Dam SMA, CRMWA Surge Tower and Aqueduct SMA.
5. All vehicles used by the operator, contractors, and other parties associated with the construction of oil and gas access roads shall not travel outside of the disturbed area.
  6. Topsoil will be stripped from all road corridors prior to commencement of construction activities and will be redistributed and reseeded on cut and fill areas after completion of the road construction activities. Disturbed areas will be reseeded in the first growing season after road construction activities are completed. The operator is responsible for ensuring that revegetation efforts along the roadway are successful.
  7. Road width shall not exceed 20 feet.
  8. All roads will be insloped, outsloped, or crowned with ditches and adequate drainage structures. Ditches should be a minimum of 18 inches wide and 12 inches deep.
  9. Roads must be surfaced with an aggregate material to minimize erosion of the road surface. Gravel on roads should be at least 4 inches thick. The material must be  $\frac{3}{4}$ " crushed gravel from a nearby source that matches the rock types and colors found in the park.
  10. As deemed necessary by a NPS representative, operators will post appropriate warning signs to alert park visitors to avoid hazard areas and to adhere to appropriate speed limits on roads.

### **Requirements for Access Road Maintenance**

A brief summary of the requirements for access road maintenance from the OGMP follows.

1. All vehicles used by the operator, contractors, and other parties associated with the maintenance and operation of oil and gas access roads shall not travel outside of the road prism.
2. Where multiple roads lead to the same well pad, only one road shall remain open to vehicular traffic. Non-essential roads must be barricaded, permanently closed, removed, and the area reclaimed.
3. Roads that are used by oil and gas operators that do not provide access to Lake Meredith or visitor facilities would be gated and locked.
4. Operators would be required to complete necessary preventative and corrective road maintenance for the duration of the oil and gas operation. Maintenance activities may include, but are not limited to, grading; gravel surfacing/resurfacing; constructing adequate drainage structures; cleaning ditches, culverts, and other drainage structures; dust abatement; reseeding side slopes; noxious weed control; and other requirements as directed by the NPS.
5. As deemed necessary by a NPS representative, operators would post appropriate warning signs to alert park visitors to avoid hazard areas and to adhere to appropriate speed limits on roads.

6. Access roads maintained by Pioneer shall not exceed a 20-foot width.
7. NPS-approved pesticides/herbicides must be used to control vegetation where mechanical or physical methods are ineffective. Pesticides/herbicides must be applied when visitors are not in the vicinity. Signs must be posed in areas that have been treated to warn park visitors of the health and safety risk. Apply pesticides/herbicides according to label directions and do not apply during windy conditions.
8. Pioneer will continually monitor all areas of operations for erosion problems and will promptly implement erosion control structures satisfactory to the NPS where necessary. Erosion control will apply to all operations (well pads as well as roads, and wells scheduled for re-entry, as well as those not scheduled for re-entry).

## **DESCRIPTION OF RECLAMATION PLAN**

As soon as possible after completion of approved operations, but no later than six months thereafter (unless a longer period of time is authorized by the Regional Director), Pioneer would initiate reclamation [36 CFR 9.39(a) (2)]. Reclamation would follow both the drilling and production phases of operations. After the wells are drilled (and, if placed in production), the wellpad size would be reduced for the production phase.

As soon as all drilling operations cease at each location, Pioneer would remove all foreign materials brought in to the park for construction, drilling, and production operations. This includes the impermeable liner and any contamination that might have occurred.

The pad and road areas would be re-contoured as near as possible to the original contour. The re-contoured ground would be fertilized and then mulched with native vegetation from the previously existing vegetation. Once fertilizer and mulch have been applied, they would be disked into the soil's surface. During annual monitoring efforts, undesirable species would be controlled either by herbicide application or hand/tool removal. The restored areas would be monitored annually until 70% coverage of targeted species is achieved. Monitoring would cease after 70% of the original vegetation coverage is achieved, or after the site has been approved by the park Superintendent with a lesser coverage.

At the completion of production operations, the wells would be plugged and all aboveground structures, equipment, and other man-made debris resulting from operations would be removed; and any contaminating substances would be removed or neutralized [36 CFR 9.39 (a)(2)]. The pad and road areas would be re-contoured as near as possible to the original contour. The re-contoured ground would be fertilized at 40 pounds per acre of 40/30/0 fertilizer, the area ripped to 18 inches and mulched with native seeds from the previously existing vegetation. During annual monitoring efforts, undesirable species would be controlled either by herbicide application or hand/tool removal, as approved by the NPS. Restored areas would be monitored annually until 70% coverage of targeted species is achieved. An annual report would be submitted to the park documenting restoration activities and results. Monitoring would cease after 70% of the original vegetative coverage was achieved or after the site had been approved by the park Superintendent.

Figure 6: Rework Facility Layout Area

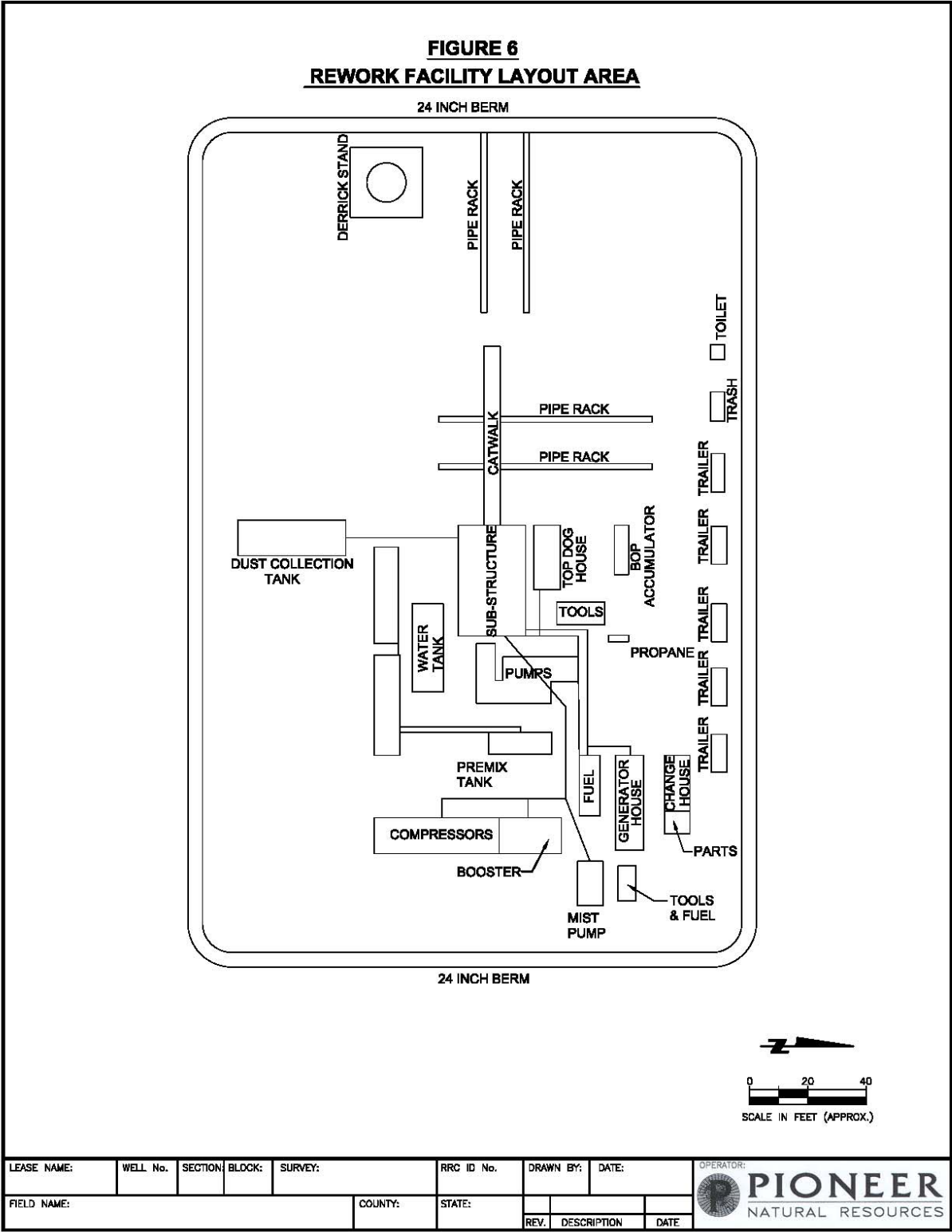
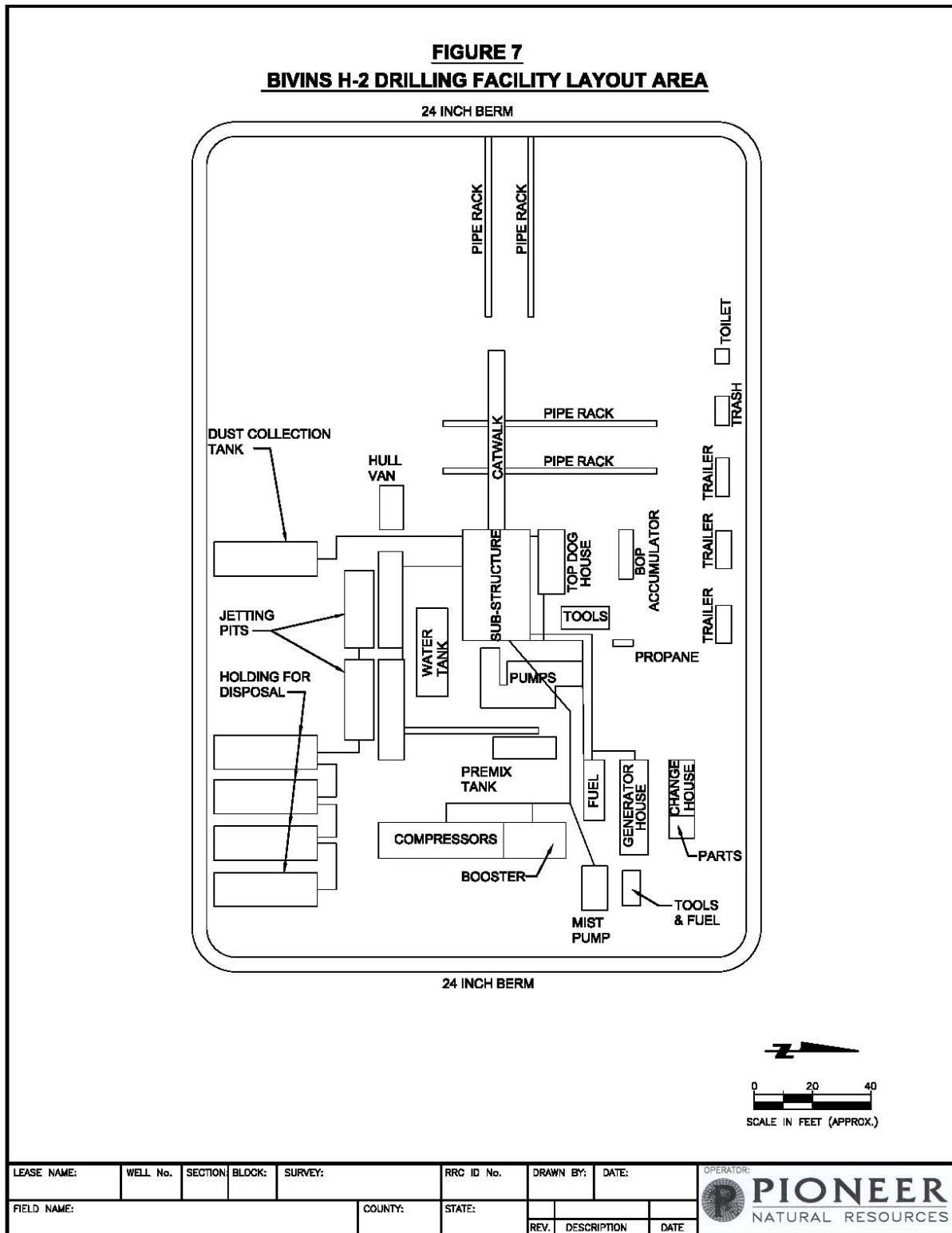


Figure 7: Bivins H-2 Drilling Facility Layout Area



## MITIGATION

In order to reduce the effects to park resources and values, the mitigation measures described in Table 8 would be applied to the oil and gas operations under Alternative B. These are based largely on the recommendations of the park's Final Oil and Gas Management Plan/Environmental Impact Statement (NPS, December 2002) for operating standards and other information. All of these are incorporated into the Plan of Operations. The location of each mitigation measure in the Plan of Operations is included for ease of reference.

**Table 8: Mitigation Measures under Alternative B, Proposed Action**

Number	Mitigation Measures under Alternative B, Proposed Action	Resources and Values Affected	Plan of Operation Reference
1	During construction, Pioneer would take precautions to prevent oil, chemicals, and other materials from reaching the ground. Precautions would include covering the entire pad with a 20 mil plastic liner including beneath the pipe racks and other equipment, as necessary.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, human health and safety	Section V, Table 4, page 12 Section V, page 20
2	Pioneer has included a spill response plan (36 CFR 9.41(f) and 9.45). Pioneer would report to the park within 24 hours of any release to the ground of 5 gallons or more of oil or contaminating substances, as defined by 36 CFR 9.31(o). Pioneer would also report any discharge into a body of water to the EPA.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section VI, page 45 Section VI, E, page 52
3	Operations areas would be fenced and gated and signed (36 CFR 9.41(e)) and (36 CFR 9.41(d))...	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section V, subsection N, page 22
4	The drill pad would be designed to slope to cellar to collect spilled contaminating substances, and drainage ditches would be dug that would route all runoff to the cellar. A portable sump pump would be used to pump the gathered liquids to steel tanks for reuse or disposal.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section V, Table 4, page 12
5	During workover and plugging operations, Pioneer would take precautions to prevent oil, brine, chemicals, and other materials from reaching the ground. Precautions would include use of plastic liners beneath the workover rig, pipe racks, and other equipment, as necessary. All fluids and solids returned to the surface from the wellbore would be collected in steel tanks and hauled to a regulated disposal facility outside the park.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, human health and safety	Section V, Table 4, page 12
6	Compressors would be equipped with drip rails to catch any lubricant oils that would leak from the machine and prevent spilled or leaked substances from contacting the ground and being transported.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, human health and safety	Section V, subsection V.1, number 7, page 22
7	If shut-in of the well occurs when drilling or production operations are suspended for 24 hours or more, but less than 30 days, the drill pipe would be run in the hole to approximately 100 feet above the last casing depth. The pipe rams would be closed and locked, and at least one safety valve would be installed in the top of the drill pipe and closed.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section V, subsection V.1, number 7, page 24
8	If production operations are suspended for 30 days or more, a back-pressure valve would be installed in the tree, and the tree gate valves would be closed and the valve handles removed.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section V, subsection V.1, number , page 24

Number	Mitigation Measures under Alternative B, Proposed Action	Resources and Values Affected	Plan of Operation Reference
9	To prevent accumulation of oil and other materials deemed to be fire hazards, all flammable liquids (i.e., condensate, compressor oil, etc.) would be stored in steel or fiberglass tanks and contained inside the firewall or a berm at the central facility. All materials not necessary for the operation of the well would be removed. Any surplus or emergency materials or supplies that need to be kept at the well site would be stored at the central facility in a locked storage shed or parts box.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section V, subsection V.1, N, number 7, page 22
10	Pioneer has included a <i>Contaminating or Toxic Substance Spill Control Plan</i> in the Plan of Operations to describe actions to be performed in the event of an oil spill, brine spill, release of drilling fluids, blow-out, or release of any toxic substance.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section VI, page 45
11	Each well would be plugged and abandoned within one year after cessation of production and a determination by Pioneer that commercial production cannot be reestablished. As soon as possible, and no later than 6 months after determining that production would not be reestablished, Pioneer would plug the well(s) and proceed with reclamation (36 CFR 9.39(a) and (b)).	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section V, subsection V.1, L, page 18
12	Wells would be plugged in accordance with NPS plugging procedures (as per Federal Onshore Oil and Gas Order #2 and state requirements). Prior to future plug and abandonment of an exhausted producing well, Pioneer will submit a detailed plugging procedure to the NPS for approval. Once a procedure is approved, Pioneer may then plug and abandon the exhausted producing well. Upon completion of any plugging operations, Pioneer will provide the Superintendent with a copy of State of Texas Form W-3, Plugging Record, or its successor form.	Groundwater	Section V, subsection V.1, L, page 18
13	Well plugging will be performed according to NPS standards at the time of abandonment. If different than provided for in this plan, the NPS shall notify Pioneer of necessary changes to the plan in accordance with 36 CFR 9.40, Supplementation or Revision of a Plan of Operations.	Groundwater	Section V, subsection V.1, L, page 19
14	Production from the natural gas wells would be monitored remotely on a daily basis utilizing electronic metering equipment at the meter-run facility that sends pertinent flow data to the district office via a cellular signal. Any interruption in flow would alert Pioneer of a possible leak in the flowline.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section V, subsection V.3, page 34
15	Any soil contaminated by oil, brine, chemicals, or other substances that would inhibit reestablishment of natural vegetation would be removed from the park and replaced with clean fill.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section VI, subsection D, page 50
16	After reseeding, the area would be monitored to assess revegetation progress. Revegetation would be considered successful when plant coverage is uniform over the site and is at least 70% of the plant coverage in adjacent undisturbed areas. If successful revegetation does not occur after a period of two years, Pioneer would take corrective actions acceptable to the NPS to ensure the reclamation standards of 36 CFR § 9.39 are achieved.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section VII, subsection B, page 57
17	Prior to any workover or plugging operations, Pioneer would notify the park Superintendent in writing and would provide the park Superintendent with verbal notification within at least 48 hours prior to the start of activities.	Soil, surface and ground water, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section V, subsection V.1, page 12 Section V, subsection V.2, page 24
18	Fresh water needed for operations, including workovers and plugging operations, would be delivered by truck and obtained from sources outside the park (36 CFR 9.35).	Municipal water supply	Section V, subsection V.1, E, page 17 Section V, subsection V.2, E, 31
19	Pioneer would paint well head and associated equipment and support buildings a sand color during next painting cycle.	Visual quality	Section V, subsection V.2, page 24

Number	Mitigation Measures under Alternative B, Proposed Action	Resources and Values Affected	Plan of Operation Reference
20	Pioneer would minimize siting of the Bivins H-2 well pad within the Dolomite Caprock Special Management Area by orienting the pad, so that, the southwest corner would be no closer than 160 feet from the Dolomite Caprock. The actual well location and drilling rig would be approximately 320 feet from the Dolomite Caprock SMA. The greatest amount of weight would be in a 15 foot radius from the well bore. To prevent closer access to the Dolomite Caprock, a barricade would be set up to prevent vehicles and personnel from entering the area, thereby minimizing impacts to the Dolomite Caprock during drilling and production operations.	Geologic resources	Section V, subsection V.2, page 24
21	For all existing and proposed operations below the estimated flood elevation of 2972 feet, will submit emergency flood procedures to the NPS by November 1, 2003 for approval in order to minimize the risk to structures, the environment, and human health and safety. Those preventative measures identified in developing the emergency flood procedures will be implemented as soon as practicable. A copy of the emergency flood procedures is provided in Appendix A.	Soil, water resources, floodplains, vegetation, wetlands, fish and wildlife, human health and safety	Section V, subsection V.1, N, number 10, page 22
22	Lease roads used to access the natural gas wells would be maintained by Pioneer in accordance with the Standard Operating Procedures for the Construction and Maintenance of Oil and Gas Access Roads in Lake Meredith National Recreation Area and Alibates Flint Quarries NM (NPS 2002).	Soil, water resources, floodplains, vegetation, wetlands, fish and wildlife, visitor use and experience, human health and safety	Section V, subsection V.1, N, number 11, page 22 Section V, subsection V.3, C, page 41
23	Ground disturbance in previously undisturbed areas is proposed by Pioneer for the construction of the well pad for the re-entry of 22 wells and drilling of the Bivins H-2 well. The development of the well pad to re-enter the 22 wells would also disturb previously undisturbed surface in addition to re-disturb areas that have been reclaimed or reclaimed naturally since the wells were originally drilled. There is also the potential for new ground disturbing activities to occur along pipeline corridors or access roads in association with spill response/remedial activities and maintenance. "Ground disturbing" activities involve any excavation below 2 inches of ground surface. Pioneer would notify the park Superintendent prior to proceeding with any ground disturbing activity. Ground disturbance activities with the potential to encounter significant cultural or paleontological resources would require Pioneer to perform resource surveys (already completed) and arrange for qualified specialists to monitor the affected ground disturbing work to identify the presence of buried cultural or paleontological resources. The Standard Operation Procedure (SOP) for <i>Locating and Protecting Paleontological Resources</i> prepared by NPS Paleontologists Vincent Santucci and H. Greg McDonald, November 2000, shall be followed.	Buried cultural and paleontological resources	Section V, subsection V.1, page 12 Section V, subsection V.2, page 24
24	Should ground disturbing activities unearth previously undiscovered archeological or paleontological resources, work in the immediate area of any discovery would cease, and Pioneer, or its contractors, shall notify the park Superintendent. In the event of an inadvertent discovery of cultural resources, the professional archeologist monitoring the project for Pioneer, in conjunction with the NPS, would consult with the Texas State Historic Preservation Office to plan a course of action required to determine the National Register of Historic Places eligibility of the discovery and assist Pioneer in the decision to re-route around the site or enter into a data recovery program without constructing the well pad or rerouting the pipeline.	Buried cultural and paleontological resources	Section V, subsection V.1, page 12 Section V, subsection V.2, page 24
25	Pioneer would educate all employees and contractors working at the Lake Meredith National Recreation Area about the need for and methods of minimizing disturbances to the land, natural resources, and wildlife.	Buried cultural and paleontological resources	Section V, subsection V.1, page 12 Section V, subsection V.2, page 24

Number	Mitigation Measures under Alternative B, Proposed Action	Resources and Values Affected	Plan of Operation Reference
26	Pioneer would be held fully accountable for its contractor's or subcontractor's compliance with the requirements of the approved Plan of Operations. Pioneer would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting paleontological resources or artifacts, or for intentionally damaging archeological sites or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown archeological resources are uncovered during construction.	Buried cultural and paleontological resources	Section V, subsection V.1, page 12 Section V, subsection V.2, page 24
27	For re-entries wells, Pioneer would replace the mud motor with an air motor to drill the curves and windows. This method would drastically reduce mud volumes/ingredients and truck traffic for bringing and removing mud, as well as reducing the chance of spillage.	Soil, surface and ground water, floodplains, vegetation, fish and wildlife, visitor use and experience, human health and safety	Section V, subsection V.1, D, page 17
28	A fresh water spray system would be used to minimize dust.	Air Quality	Section V, subsection V.1, D, number 3, page 17
29	A closed loop "zero discharge system" for drilling the well. No earthen pits would be utilized. All mud, drill cuttings, sewage and produced water would be collected in steel tanks for re-use or hauled by sealed dump trucks for disposal at state-approved disposal facilities outside of the park boundaries	Air Quality	Section V, subsection V.1, D, number 3, page 17  Section V, subsection V.2, D, page 30
30	Care should be taken to ensure that no soil from construction activities drift into the Cottonwood-Tallgrass plant community located near the Masterson A-9. A fence will be placed three or more feet from the drop-off into this community to keep heavy equipment out of the imperiled area.	Vegetation	Section X, Vegetation, Page 80
31	Pioneer would continually monitor all areas of operations for erosion problems and will promptly implement erosion control structures satisfactory to the NPS where necessary. Erosional control will apply to all operations (well pads as well as roads and wells scheduled for re-entry as well as those not scheduled for re-entry.	Soil, surface and ground water, floodplains	Section V, subsection, V.3 page 35,
32	In the future should the need for pipeline repair arise, Pioneer will submit the repair procedures, site specific description of the affected environment, and any reclamation actions to the NPS for approval, as needed. In addition, if maintenance, repair or renovation operations, even in previously disturbed areas, are expected to adversely impact more than 0.1 acres of a wetland, then a NEPA document in addition to a Wetland Statement of Findings (SOF) will need to be prepared. Even though the impacts may be temporary, the primary issues are the magnitude of the impact, adequate compensation for the impacts, and restoration of the wetland. These issues would be defined in a SOF and the necessary reclamation requirements incorporated into the Plan of Operations. Cultural and paleontological clearances and monitoring may also be necessary. Pioneer will obtain NPS approval prior to initiating repair work of this nature.	Wetlands, paleontology, and cultural resources	Section V, subsection V.3, page 35
33	Surface reclamation will be performed according to NPS standards at the time of abandonment. If different than provided for in this plan, the NPS shall notify Pioneer of necessary changes to the plan in accordance with 36 CFR 9.40 Supplementation or Revision of a Plan of Operations.	Soil, surface and ground water, floodplains	Section V, B, page 59
34	An affidavit by Pioneer to operate and comply with all applicable Federal, State, and local laws and regulations	Soil, surface and ground water, floodplains, air quality, vegetation, fish and wildlife, visitor use and experience, human health and safety	Appendix H of Plan of Operations

## **2.2. ALTERNATIVES CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS**

During the scoping process for this project, an additional three re-entry wells (Masterson B-29, Bivins A-165, and Warrick A-3) were proposed for well pad expansion. However, due to the available area to expand the well pads, these wells were dropped from the Pioneer re-entry program.

### **NPS Acquisition of the Mineral Rights that are Part of Pioneer's Proposal**

In the event that a proposed operation cannot be sufficiently modified to prevent the impairment of park resources and values, the NPS may seek to extinguish the associated mineral right through acquisition, subject to the appropriation of funds from Congress. With respect to the Pioneer proposed Plan of Operations, mitigation measures were identified and applied, which substantially reduced the potential for adverse impacts to park resources and values. As a result, the acquisition of mineral rights was dismissed from further consideration in this EA.

## **2.3. NPS ENVIRONMENTALLY PREFERRED ALTERNATIVE**

Section 101 of the National Environmental Policy Act (NEPA) states that "...it is the continuing responsibility of the Federal Government to...(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice; (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources" [42 U.S.C. §4321 et seq. §101 (b)].

Under Alternative A, No Action, Pioneer would continue to operate and maintain the 45 existing gas wells and their associated pipelines and access roads; 22 of these wells would not be re-entered, and no additional wells would be drilled. Because there would be no new impacts from these activities, and existing operations would be under a ratified Plan of Operations, Alternative A would provide the greatest protection of area and park resources and values. Alternative A meets five of the six criteria (1 thru 4, and 6) and is therefore the environmentally preferred alternative.

Despite the added assurance that the Oil and Gas Management Plan/EIS would provide specific mitigation measures to protect park resources and values, Pioneer's Proposal, Alternative B, would have greater effects on the environment because of the new operations proposed, including well pad expansion and re-entry of 22 wells and drilling and re-entry of 1 new vertical well. Alternative B meets four of the six criteria (1, 2, 4, and 5). Although mitigating measures would reduce effects to park resources and values, there would still be effects, and therefore this alternative would not meet the Park Service's environmental policy goals as well as the No Action Alternative.

## **2.4. NPS PREFERRED ALTERNATIVE**

The environmentally preferable alternative is Alternative A because it surpasses Alternative B in realizing the full range of national environmental policy goals as stated in 101 of NEPA. However, because Lake Meredith National Recreation Area must respect the exercise of oil and

gas rights, the environmentally preferred alternative was not selected as the NPS preferred alternative. The NPS preferred alternative is Alternative B, Proposed Action. The NPS believes this alternative would fulfill its mandates and direction, giving due consideration to environmental, economic, technical, and other factors. Table 9 outlines both alternatives and how well each alternative meets the objectives of this project. The actions required for this project and to what extent park resources are impacted are summarized in Tables 10 and 11.

**Table 9: Extent that Each Alternative Meets Objectives**

<b>Objectives</b>	<b>Does Alternative A: No Action Meet Objective?</b>	<b>Does Alternative B: (Proposal) Plan of Operations as Submitted Meet Objective?</b>
Provide Pioneer, as a holder of nonfederal oil and gas mineral interests, reasonable access for exploration and development.	<b>No (Does not meet Objective)<sup>1</sup></b> Under Alternative A, this objective would only partially be met. Pioneer would continue to operate its existing 45 wells and associated pipelines and access roads; however, the wells would not be permitted to be re-entered and a new well would not be drilled, precluding Pioneer reasonable access to develop its nonfederal oil and gas mineral interests.	<b>Yes (Meets Objective)</b> Under Alternative B, Pioneer would continue to operate its existing 45 wells and associated pipelines and access roads, re-enter 22 of the 45 existing wells and drill one new well. The wells would be permitted to be re-entered or drilled and produced, with the application of mitigation measures to meet other objectives for protecting park resources.
Avoid or minimize impacts on park resources and values, visitor use and experience, and human health and safety	<b>Yes (Meets Objective)</b> Under Alternative A, Pioneer would continue to operate its existing 45 wells and associated pipelines and access roads under its ratified Plan of Operations. These existing operations are not “grandfathered” from the 9B regulations. Therefore, mitigation measures would be applied and impacts would be avoided or minimized to acceptable levels. However, operations and maintenance would not meet all of the requirements specified in the Final Oil and Gas Management Plan (April 2002) for maintenance of access roads, operations occurring in floodplains, and reclamation requirements.	<b>Yes (Meets Objective)</b> Under Alternative B, Pioneer would continue to operate its existing 45 wells and associated pipelines and access roads, re-enter 22 of the 45 existing wells, and drill one new well. Mitigation measures would avoid or minimize impacts and operations and maintenance would meet all of the requirements specified in the Final Oil and Gas Management Plan (April 2002).
Protect and prevent impairment of park resources and values.	<b>Yes (Meets Objective)</b> Under Alternative A, Pioneer would continue to operate its existing 45 wells and associated pipelines and access roads-under its ratified Plan of Operations. Under Alternative A, adherence to mitigation measures would result in no impairment of park resources and values.	<b>Yes (Meets Objective)</b> Under Alternative B, Pioneer would continue to operate its existing 45 wells and associated pipelines and access roads, re-enter 22 of the 45 existing wells and drill one new well. Under Alternative B, adherence to mitigation measures would result in no impairment of park resources and values.

<sup>1</sup>The No Action Alternative is not required to fully meet all of the planning objectives.

## 2.5. COMPARISON OF ALTERNATIVES

A comparison of the alternatives and environmental impacts of the alternatives are summarized in Tables 10 and 11. Table 11 compares the impacts to environmental resources associated with re-entry of existing natural gas wells and drilling the new well, and continued operation and maintenance of all the natural gas wells and associated pipelines are included. In addition, impacts associated with the No Action Alternative are included for a baseline comparison.

**Table 10: Comparison Summary of Alternatives**

<b>Actions</b>	<b>Alternative A No Action</b>	<b>Alternative B Proposed Action</b>
<b>Number of Wells</b>	Pioneer would continue to operate 45 existing wells.	Pioneer would continue to operate 45 existing wells, re-enter 22 existing wells and drill and re-enter 1 additional well. For a total future operation and maintenance of 46 wells.
<b>Access Roads</b>	No new access roads would be constructed, Pioneer would continue to maintain and use its existing 35.42 miles of access roads within the park boundary. Pioneer would operate under its ratified Plan of Operations. Under the ratified Plan of Operations, there are no requirements specified for operations and maintenance of access roads. Operations and maintenance would not meet all of the requirements specified in the Final Oil and Gas Management Plan (April 2002).	The Bivins H-2 is located adjacent to an existing access road, so no new access roads would be constructed. Pioneer would continue to maintain and use its existing 35.42 miles of access roads. However, operations and maintenance for access roads would meet all of the requirements specified in the Final Oil and Gas Management Plan (April 2002)
<b>Wellpads</b>	No new wellpads would be expanded or constructed. Pioneer would continue to maintain their 24.41 acres of well pads.	Pioneer would continue to maintain their 45 existing wells pads (24.41 acres). For the re-entry wells, Pioneer would expand 22 of the 45 existing well pads using conventional foundation construction techniques to approximately 1-acre in size, resulting in an additional disturbance of approximately 8 acres. In addition, approximately 1- acre disturbance is anticipated for drilling and re-entry of the new proposed well (Bivins H-2). Berms would be constructed around the perimeter. All equipment, machinery and living quarters would be placed on the pad.
<b>Production Facility</b>	No new production facilities would be constructed.	If the Bivins H-2 well proves to be productive, Pioneer would place a production facility on the wellpad.
<b>Pipelines</b>	No new pipelines would be constructed. Pioneer would continue to maintain and operate their existing 63 pipelines, totaling 36.93 miles of pipeline.	Pioneer would continue to maintain and operate their existing 63 pipelines (36.93 miles). If the Bivins H-2 well proves to be productive, Pioneer would construct a small section (387 linear feet) of pipeline from the well pad within the current access road to the boundary of the park.
<b>Total Acres of Disturbance</b>	110.27 Acres	119.27 Acres
<b>Reclamation Plan</b>	Pioneer would operate under its ratified Plan of Operations. Under their ratified Plan of Operations, Pioneer would remove all foreign materials from the park. All surface disturbances would be re-contoured as near as possible to the original contour. The ground	Pioneer would remove all foreign materials from the park. All surface disturbances would be re-contoured as near as possible to the original contour. The ground would be fertilized and mulched with native vegetation. The mulch would be disked into the ground.

<b>Actions</b>	<b>Alternative A No Action</b>	<b>Alternative B Proposed Action</b>
	would be fertilized and mulched with native vegetation. However, there are no requirements specified in the Plan of Operations as to the percentage of native vegetation cover that would need to be achieved. Reclamation would not meet all of the requirements specified in the Final Oil and Gas Management Plan (April 2002).	Hand tools or herbicides would control undesirable species. The restored area would be monitored until 70% native vegetation cover was achieved, as specified in the Final Oil and Gas Management Plan (April 2002).

**Table 11: Comparative Summary of Impacts**

Impact Resource	Alternative A: No Action	Alternative B: Proposed Action
Nonfederal Oil and Gas Development	<p>Under Alternative A, No Action, Pioneer would continue to operate and maintain 45 natural gas wells and associated pipelines and access roads as specified under their ratified Plan of Operations. None of the wells would be re-entered and/or redrilled, and no new wells would be drilled, resulting in <b>negligible impact</b> on domestic energy supplies and a <b>moderate to major adverse impact</b> on Pioneer. If Pioneer decides to not to drill additional wells there could be a <b>moderate to major, cumulative, adverse impact</b> on Pioneer and a cumulative, <b>negligible to minor, adverse impact</b> on domestic energy supplies.</p>	<p>Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and, in addition, would re-enter 22 of these gas wells and drill 1 new vertical well. If hydrocarbons are discovered and production is increased, these could result in a <b>negligible to minor beneficial impact</b> on domestic energy supplies and a <b>moderate beneficial impact</b> on Pioneer. There would be a <b>minor adverse impact</b> on Pioneer due to costs and time invested in preparing a Plan of Operations and Environmental Assessment, drilling and completing and/or plugging the wells.</p> <p>If additional wells are drilled and completed in the park, there could be a <b>negligible to minor, beneficial cumulative impact</b> on domestic energy supplies and a <b>moderate, beneficial cumulative impact</b> on Pioneer and associated mineral owners.</p>
Geology and Soil Resources	<p>Pioneer would not re-enter 22 of 45 natural gas wells, nor drill 1 new vertical well, and continue to operate associated pipelines and access roads; therefore, there would be no new impacts on geology and soil resources associated with these activities.</p> <p>Existing impacts on geology and soil resources would continue from the operation of 45 existing gas wells and their associated pipelines and access roads, resulting in a direct disturbance of 114.72 acres.</p> <p>The continuing operation of the 45 natural gas wells over the next 10 to 25 years, with associated use and maintenance of access roads, well pads, compressors, and flowlines, could compact and rut soils, potentially increase surface run-off and erosion, and reduce soil permeability, resulting in <b>localized, short to long-term, negligible to minor, adverse impacts on geology and soil resources</b> for the duration of operations. Existing operations are not “grandfathered” from the 9B regulations and mitigation measures would be applied and impacts would be avoided or minimized to acceptable levels. Pioneer’s ratified Plan of Operations includes a spill control plan, a reclamation plan and an</p>	<p>Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and, in addition, would re-enter 22 of these gas wells and drill 1 new vertical well resulting in an additional disturbance to geology and soil resources of approximately 9 acres for a total disturbance of 123.72 acres</p> <p>Under the proposed action, the mitigation measures to adhere to the NPS’s SOP for the Construction and Maintenance of Access Roads and to revegetate with native species during reclamation to 70% ensures that soil erosion would be minimized. For drilling new well (Bivins H-2) only the well pad would be located within the 300-foot setback of the Dolomite Caprock. With mitigation, constructing the well/production pad, and drilling and producing the wells, would result in <b>localized, short- to long-term, negligible to minor direct and indirect adverse impacts</b> on geology and soil resources.</p> <p>Cumulative impacts would be similar to those described under Alternative A, No Action, with an increase of surface disturbance of 9 acres and added protection of mitigation measures, resulting in <b>localized, short to long term, negligible to minor, adverse impacts</b> on geology and soils around park or oil and gas developments.</p>

Impact Resource	Alternative A: No Action	Alternative B: Proposed Action
	<p>affidavit by Pioneer to operate in compliance with all applicable Federal, State, and local laws and regulations. However, the ratified Plan of Operations does not specify that Pioneer would have to revegetate native species during reclamation to 70% cover, which ensures that soil erosion would be minimized. In addition, Under the ratified Plan of Operations, the operations and maintenance of access roads would not meet all of the requirements specified in the Final Oil and Gas Management Plan (April 2002).</p> <p>Hydrocarbons, produced waters, or treatment chemicals could be released during production or transport, with negligible to moderate adverse impacts. However, with mitigation and prompt response in the event of a spill, the intensity of adverse impacts would be <b>localized, short- to long term, negligible to minor</b>. The existing well pad areas were previously disturbed and no new impacts would occur.</p> <p>Cumulative impacts from existing and future oil and gas operations in the park, park developments and operations, and visitor uses are expected to result in <b>localized, short to long term, negligible to minor adverse impacts</b> on geology and soils within the park.</p> <p><b>No impairment</b> to geologic resources would result from implementation of this alternative.</p>	<p><b>No impairment</b> to geology and soil resources would result from implementation of this alternative.</p>
Floodplains	<p>Pioneer would not re-enter 22 of the existing gas wells, nor drill 1 new vertical well; therefore, there would be no new impacts on floodplains associated with these activities. Four existing well pads and associated operations are currently located in the estimated 100-year floodplain and three existing wells pads are located within the estimated 500-year floodplain would continue to directly occupy 3.39 acres. Under Alternative A, Pioneer would continue to operate its existing 45 wells and associated pipelines and access roads-under its ratified Plan of Operations. These existing operations are not “grandfathered” from the 9B regulations; therefore, mitigation</p>	<p>Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and, in addition, would re-enter 22 of these gas wells and drill 1 new vertical well. Under Alternative B, additional activities are proposed for re-entering seven existing well pads and associated operations located in the estimated 100-year and 500-year floodplain. An additional 3.61 acres of direct impact to the floodplain under alternative B would occupy a total of 7 acres of floodplain.</p> <p>The Plan of Operations, as submitted, includes procedures for erosion control measures, secondary containment, and routine maintenance of access roads, well pads and equipment for all current operations located within the estimated 100-year and 500-year floodplains. Storage tanks</p>

Impact Resource	Alternative A: No Action	Alternative B: Proposed Action
	<p>measures would be applied and impacts would be avoided or minimized to acceptable levels; However, operations and maintenance would not meet all of the floodplain requirements specified in the Final Oil and Gas Management Plan (April 2002), resulting in <b>localized, short to long-term, minor, adverse impacts</b> on floodplains within the park.</p> <p>Cumulative effects on floodplains from existing and future oil and gas operations in the park, park developments and operations, and visitor uses are expected to result in <b>localized, short- to long-term, negligible to minor adverse impacts</b></p> <p><b>No impairment</b> to floodplains would result from this alternative.</p>	<p>and drip tanks are currently covered. Mitigation measures also include development of emergency flooding procedures, a spill control plan and an affidavit by Pioneer to operate in compliance with all applicable Federal, State, and local laws and regulations were prepared. These measures, in addition to the existing performance bond, would ensure rapid response in the event of a leak or spill, thereby providing better assurance that adverse impacts on floodplains would be minimized. Because the proposed action is located with a regulatory floodplain, a Statement of Findings (SOF) as required by the NPS's Director's Order 77-2; Floodplain Management was prepared by the park. In addition, a mitigation measure to adhere to the NPS's SOP for the Construction and Maintenance of Oil and Gas Access Roads in Lake Meredith National Recreation Area and Alibates Flint Quarries NM would ensure that soil erosion would be minimized. As a result of applying these and other mitigation measures, construction, drilling and production operations would result in <b>localized, short-to long-term, negligible adverse impacts</b> on floodplains.</p> <p>Cumulative impacts on floodplains would be similar to those described under Alternative A, No Action, with an increase of surface disturbance of 9 acres and added protection of mitigation measures; resulting in <b>localized, short- to long-term, negligible to minor adverse impacts</b> in the areas around park or oil and gas developments.</p> <p><b>No impairment</b> to floodplains would result from implementation of this alternative.</p>
Vegetation	<p>Pioneer would not re-enter 22 of the existing gas wells, nor drill 1 new vertical well; therefore, there would be now new impacts on vegetation associated with these activities. Existing impacts on vegetation would continue from the operation of 45 existing gas wells and their associated pipelines and access roads, resulting in a direct disturbance of 114.72 acres.</p> <p>These existing operations are not "grandfathered" from the 9B regulations; therefore, mitigation measures would be applied and impacts would be avoided or minimized to acceptable levels. However, operations and maintenance would not meet all of the requirements specified in the Final Oil and Gas Management Plan (April 2002) to revegetate with native species during</p>	<p>Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and, in addition, would re-enter 22 of 45 existing gas wells and drill 1 new vertical well resulting in an additional disturbance of approximately 9 acres for a total disturbance of 119.27 acres.</p> <p>Under the proposed action, the mitigation measure to revegetate with native species during reclamation to 70% cover ensures that vegetation would be restored. With mitigation, constructing the well/production pad, and drilling and producing the wells, would result in <b>localized, short- to long-term, negligible to minor direct and indirect adverse impacts</b> on vegetation.</p> <p>Cumulative effects would be similar to those described under Alternative A, No Action, with an increase of surface disturbance of 9 acres and added protection of mitigation</p>

Impact Resource	Alternative A: No Action	Alternative B: Proposed Action
	<p>reclamation to a 70% cover. The continued operation and maintenance would result in <b>localized, minor to moderate, direct and indirect, adverse impacts</b> on vegetation for the duration of the existing operations (up to 10 to 25 years), until the wells are plugged and the pads, flowlines, and access roads are reclaimed.</p> <p>Cumulative impacts from existing future oil and gas operation in the park, routine park operations, and visitor uses are expected to result in <b>localized, short to long-term, negligible to moderate, direct and indirect adverse impacts</b> in the areas around park on oil and gas developments.</p> <p><b>No impairment</b> to vegetation would result from implementation of this alternative.</p>	<p>measure, <b>resulting in localized, short- to long-term, negligible to minor, direct and indirect</b>, on vegetation in the park.</p> <p><b>No impairment</b> to vegetation would result from implementation of this alternative.</p>
Wildlife	<p>Pioneer would not re-enter 22 of the existing gas wells, nor drill and re-enter 1 vertical well; therefore, loss of habitat for wildlife would remain at a direct loss of 114.72 acres.</p> <p>Existing impacts on wildlife would continue from the operation of 45 existing gas wells and their associated pipelines and access roads, resulting in <b>short to long-term, negligible to minor, direct and indirect, adverse impacts</b> on wildlife, <b>localized</b> near developments and activities within the park.</p> <p>Cumulative effects from existing and future oil and gas operations in the park, park developments and operations, and visitor uses are expected to result in <b>short to long-term, negligible to minor, direct and indirect adverse impacts, localized</b> around park and oil and gas developments.</p> <p><b>No impairment</b> to wildlife would result from implementation of this alternative.</p>	<p>Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and in addition, would re-enter 22 of these gas wells and drill 1 new vertical well, resulting in an additional disturbance of approximately 9 acres for a total disturbance of 123.72 acres.</p> <p>Existing impacts on wildlife would continue from the operation of 45 existing gas wells and their associated pipelines and access roads and would increase slightly during the construction and drilling phase of the project but with the added protection of mitigation measures, resulting in <b>localized, short- to long-term, negligible to minor adverse impacts</b> on wildlife.</p> <p>Cumulative effects would be similar to those described under Alternative A, with an increase of surface disturbance of 9 acres and added protection of mitigation measures, resulting in <b>short- to long-term, negligible to minor, direct and indirect, adverse impacts</b> on wildlife in <b>localized</b> areas around the park and oil and gas developments.</p> <p><b>No impairment</b> to wildlife would result from implementation of this alternative.</p>
Visitor Use and Experience	<p>Pioneer would not re-enter 22 of the existing gas wells, nor drill 1 new vertical well; therefore, there would be now new impacts on visitor use and experience associated with these</p>	<p>Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and in addition, would re-enter 22 of these gas wells and drill 1 new vertical well, requiring construction of</p>

Impact Resource	Alternative A: No Action	Alternative B: Proposed Action
	<p>activities. Existing impacts on visitor use and experience would result from operation and maintenance of the existing wells, pipelines, and lease roads, resulting in <b>localized, short-term to long-term, negligible to minor, adverse impacts</b> on visitor use and experience.</p> <p>Cumulative impacts from existing and future oil and gas operations in the park, park developments and operations, and visitor uses are expected to result in <b>localized, short-to long-term, negligible to minor adverse impacts</b>.</p> <p><b>No impairment</b> to visitor use and experience would result from implementation of this alternative.</p>	<p>the well/production pads, drilling and production of the well, as well as operation and maintenance of the access road. These activities would result in <b>localized, short-term to long-term, negligible to minor, adverse impacts</b> on visitor use and experience.</p> <p>Cumulative impacts would be similar as those discussed under Alternative A, No Action, with an increase of surface disturbance of 9 acres and added protection of mitigation measures, resulting in <b>short-to long-term negligible to minor adverse impacts</b> on visitor use and experience, localized around existing and future developments throughout the park.</p> <p>Reclamation of the construction area would result in a <b>minor to moderate beneficial impact on visitor use and experience</b>.</p> <p><b>No impairment</b> to visitor use and experience would result from implementation of this alternative.</p>

### 3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

#### Methodology

This section describes direct, indirect, and cumulative impacts under the two alternatives. Impacts are described in terms of context, duration, and intensity. The context or extent of the impact may be **localized** (affecting the project area or a single company) or **widespread** (affecting other areas of the park and/or the project area, or an industry). The duration of impacts could be **short-term**, ranging from days to three years in duration, or **long-term**, extending up to 20 years or longer. Generally, short-term impacts would apply to construction activities and long-term impacts would apply to roads, production operations, and pipelines. The intensity and type of impact is described as negligible, minor, moderate, or major, and as beneficial or adverse. Where the intensity of an impact can be described quantitatively, the numerical data are presented. However, most impact analyses are qualitative.

**Cumulative Impacts:** The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). The following descriptions of park development and operations, and nonfederal oil and gas development in the park provide the basis for analyzing cumulative impacts in this chapter:

**Park Development and Operations:** Currently, there are two main information stations located within the park: The District Ranger Station and the Alibates Contact Station. In addition to the stations there are 16 day and overnight visitor use areas, two established hiking trails (Alibates Trail and Devils Canyon Trails), two off-road vehicle use areas (Big Blue Creek Area and Rosita Area), Sanford Dam and the lake. Sanford Dam is a primary visitor attraction within Lake Meredith National Recreation Area. The park maintains 53 miles of dirt and paved roadways, occupying an estimated 193 acres (based on a typical 30-foot wide road corridor). Due to the isolated nature of the 16 discrete use areas, visitors must navigate their way over a road and highway system consisting of farm-to-farm market roads, county roads, and State and U.S. Highways. There are no past developments or activities that continue to impact the park's resources or values; and no new developments are planned in the future.

Park activities that could contribute to impacts on park resources and values include prescribed fires, routine maintenance of the park roads, park and visitor vehicle use, and public recreational activities such as motor boating, and burning of campfires

**Oil and Gas Developments:** Oil and gas exploration and production have been actively pursued at Lake Meredith National Recreation Area and Alibates Flint Quarries since the late 1920's. Currently, there are 173 active nonfederal oil and gas operations within Lake Meredith National Recreation Area and Alibates Flint Quarries National Monument, evidence of 15 abandoned operation sites, 40 miles of active oil field access roads, 104 miles of abandoned roads, and 39 miles of existing transpark and gas pipelines. The existing roads are used by 17 nonfederal oil and gas operators to access their operations located throughout the park, by park staff to conduct routine park operations, and by park visitors.

**Impairment:** For each Park resource or value evaluated, an assessment of potential impairment is made. Impairment is a major, adverse impact to a resource or value whose conservation is: 1) necessary to fulfill a specific purpose identified in the establishing legislation; 2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or 3) identified as a goal in the park's Oil and Gas Management Plan or other relevant NPS planning documents.

The impact analyses are organized by impact topic. Under each impact topic, the affected environment is described, impacts under each alternative are evaluated, a cumulative impact analysis is provided (analysis area is parkwide), and a conclusion is stated. The conclusion section summarizes key findings, including whether or not an impairment of resources or values is likely or would occur. Impairment analyses are only performed for park resources and values.

### 3.1. Nonfederal Oil and Gas Development

#### Methodology

To analyze the impacts on nonfederal oil and gas development, the park reviewed current and historic drilling operations that have been conducted within the park since the mid 1900's. Information from the park's enabling legislation, current state and federal laws and regulations, and the park's approved Oil and Gas Management Plan was also utilized.

The thresholds of change for the intensity of an impact are defined as follows:

- |                    |  |
|--------------------|--|
| <b>Negligible:</b> | The impact is barely measurable, and/or would not affect domestic energy supplies or Pioneer.                        |
| <b>Minor:</b>      | The impact is slight but measurable, and/or would affect domestic energy supplies or Pioneer.                        |
| <b>Moderate:</b>   | The impact is readily apparent, and/or would affect domestic energy supplies or Pioneer.                             |
| <b>Major:</b>      | The impact is severely adverse or exceptionally beneficial, and/or would affect domestic energy supplies or Pioneer. |

#### 3.1.1. Affected Environment

Oil and gas exploration and production have been actively pursued at Lake Meredith National Recreation Area and Alibates Flint Quarries since the late 1920's. Currently, there are 173 active nonfederal oil and gas operations within Lake Meredith National Recreation Area and Alibates Flint Quarries National Monument, evidence of 15 abandoned operation sites, 40 miles of active oil field access roads, 104 miles of abandoned roads, and 39 miles of existing transpark and gas pipelines. The existing roads are used by 17 nonfederal oil and gas operators to access their operations located throughout the park, by park staff to conduct routine park operations, and by park visitors.

Currently, Pioneer's operations includes 45 natural gas wells, 133 drip stations, 63 pipelines and approximately 36 miles of oil and gas access roads within the park boundary. Pioneer's operations and maintenance of the wells include: bi-annual meter checks, daily or weekly gauging activities, maintenance on compressors or other equipment, collection of condensate from drip stations, periodic road maintenance which includes grading and fixing ruts, and periodic painting of equipment.

In 2000, the NPS prepared a reasonably foreseeable development (RFD) scenario for inclusion in the park's Oil and Gas Management Plan/Environmental Impact Statement. The RFD projects that up to 85 new wells would be developed over the next 15-20 years to produce the oil and gas projected in the RFD scenario in Lake Meredith National Recreation Area and Alibates Flint Quarries National Monument. Flowlines, gathering lines and compressors associated with the new wells would be constructed. Most of the operations (up to 65 wells) would be redrills and lateral extensions from existing wellbores. There may also be up to 20 new wells drilled to develop the estimated hydrocarbons in the parks. If all the activities in the RFD scenario occur within the parks, there could be up to 52 acres of new surface disturbance. The total direct, surface disturbance (including previously disturbed sites and access roads) could total 150 acres.

### **3.1.2. Impacts of Alternative A, No Action, on Nonfederal Oil and Gas Development**

Under Alternative A, No Action, Pioneer would continue to operate and maintain 45 natural gas wells and associated pipelines and access roads as specified under their ratified Plan of Operations. None of the wells would be re-entered/redrilled and no new wells would be drilled, resulting in negligible impacts on domestic energy supplies. There could be moderate to major adverse impacts on Pioneer due to the cost to collect data, and prepare a Plan of Operations, and lost revenues since Pioneer would not develop their private mineral interests at these locations.

### **Cumulative Impacts**

Under Alternative A, No Action, if Pioneer does not re-enter or drill additional oil and gas wells in the park, there could be a moderate to major, cumulative, adverse impact on Pioneer, and a cumulative, negligible, adverse impact on domestic energy supplies from potential production of oil and gas.

### **Conclusion**

Under Alternative A, No Action, Pioneer would continue to operate and maintain 45 natural gas wells and associated pipelines and access roads as specified under their ratified Plan of Operations. None of the wells would be re-entered/redrilled and no new wells would be drilled, resulting in negligible impact on domestic energy supplies, and a moderate to major adverse impact on Pioneer. If Pioneer decides to not to drill additional wells there could be a moderate to major, cumulative, adverse impact on Pioneer and a cumulative, negligible to minor, adverse impact on domestic energy supplies.

### **3.1.3. Impacts of Alternative B, Proposed Action, on Nonfederal Oil and Gas Development**

Under Alternative B, Proposed Action, Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and in addition, would re-enter 22 of these gas wells and drill one new vertical well. If hydrocarbons are discovered and production is increased, there could result in a negligible to minor beneficial impact on domestic energy supplies. If production is increased, the financial effects on Pioneer and the associated mineral owners would be a moderate beneficial impacts. Costs and time Pioneer has invested in preparing a Plan of Operations, Environmental Assessment, drilling and completing and/or plugging the wells would result in a minor adverse impact on Pioneer.

### **Cumulative Impacts**

Under Alternative B, Proposed Action, if the wells are not productive, the cumulative impact on nonfederal oil and gas development would be the same as under the No-Action alternative. Should additional exploration and development wells be drilled and completed in the park by other operators (according to the RFD), production of petroleum resources under the park would increase, and may result in a minor, beneficial, cumulative impact on domestic energy supplies and a minor to major, beneficial, cumulative impact on Pioneer and associated mineral owners.

### **Conclusion**

Under Alternative B, Proposed Action, Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and, in addition, would re-enter 22 of these gas wells and drill 1 new vertical well. If hydrocarbons are discovered and production is increased, these could result in a negligible to minor beneficial impact on domestic energy supplies. There would be a minor adverse impact on Pioneer due to costs and time invested in preparing a Plan of Operations and Environmental Assessment, drilling and completing and/or plugging the wells. If additional wells are drilled and completed in the park, there could be a negligible to minor, beneficial cumulative impact on domestic energy supplies and a moderate, beneficial cumulative impact on Pioneer and associated mineral owners.

## **3.2. GEOLOGY AND SOIL RESOURCES**

### **Methodology**

To analyze the impacts on geology and soils, all available information on geological resources in the park was compiled including research, previous Plans of Operations, and the park's approved Oil and Gas Management Plan.

The thresholds of change for the intensity of an impact are defined as follows:

- |                    |  |
|--------------------|--|
| <b>Negligible:</b> | An action that could result in a change to a natural physical resource, but the change would be so small that it would not be of any measurable or perceptible consequence.    |
| <b>Minor:</b>      | An action that could result in a change to a natural physical resource, but the change would be small and of little consequence.   |
| <b>Moderate:</b>   | An action that could result in a change to a natural physical resource; the change would be measurable and of consequence.   |
| <b>Major:</b>      | An action that would result in a noticeable change to a natural physical resource; the change would be measurable and result in a severely adverse or major beneficial impact. |

#### **3.2.1. Affected Environment**

Lake Meredith National Recreation Area is located near the geographic center of the Texas Panhandle, about 40 miles northeast of Amarillo and 9 miles west of Borger. Its key feature is the Canadian River that flows eastward across the Texas Panhandle. The Canadian River carved a narrow steep-walled canyon that is 200 to 300 feet deep and up to 2 miles wide. Between this canyon and the caprock, many tributary streams have caused a rough and broken topography known as the

Canadian River Breaks. The construction of Sanford Dam between these “breaks” created Lake Meredith.

Over 67% of the landbase of the park is comprised of slopes greater than or equal to 12%. Maintenance of drill pads, access roads, and flowlines can be difficult on steep slopes, and without adequate erosion control measures, would result in landslides, soil erosion, and increased sedimentation in Lake Meredith. Masterson B-13 and Masterson B-26 wells are located in a floodplain on flat terrain ranging from 0 to 3% slope, while Masterson B-13 and Masterson B-26 wells are perched on a terrace having 3 to 5% slopes. Wells Bivins A-42, Bivins A-46, Masterson A-9, Masterson B-20, Masterson B-23, Masterson B-29, Masterson B-51, Masterson B-73, and the Sneed E-1 have slopes between 12 and 25%. The remaining wells have slopes between 25 and 90%. This adjacent area is subject to active geologic erosion and generally slopes are steep enough. Plant coverage is not sufficient to prevent rapid runoff.

**Surface Geology.** A geologic reconnaissance of the well sites was completed by URS in March 2002 to support project design and preparation of this EA. The purpose of the geologic reconnaissance was to identify the geologic units located at the well pads. The surface geology in the area of the existing 45 natural gas wells and the proposed new well (Bivins H-2) are shown in Table 12.

**Table 12: Geologic Surface Formation**

Well	RRC #	Surface Formation				
		Holocene/ Pleistocene	Pliocene/ Miocene	Triassic Dockum Group	Permian Quartermaster / Alibates	Slope %
Bivins A-29*	023299				X	25-90
Bivins A-42*	023311		X			12-25/25-90
Bivins A-46*	023315				X	12-25/25-90
Bivins A-49*	023318				X	25-90
Bivins A-53*	023322				X	25-90
Bivins A-136*	023399		X			25-90
Bivins A-160	023418				X	12-25
Bivins A-165	033025				X	12-25
Bivins A-166*	033026				X	5-12
Bivins A-206	169635		X			25-90
Bivins A-208	169413				X	12-25
Bivins H-1	023430				X	25-90
Fee A-2*	023455				X	25-90
Masterson A-9*	023487		X			12-25
Masterson B-3*	023511				X	25-90
Masterson B-11*	023515				X	25-90
Masterson B-13*	023517				X	0-3
Masterson B-20*	023524				X	12-25
Masterson B-23*	023527				X	12-25
Masterson B-25*	023529				X	5-12
Masterson B-26*	023530		X			0-3
Masterson B-29	023533				X	12-25

Masterson B-31*	023535		X			5-12
Masterson B-51*	023553				X	12-25
Masterson B-73*	023572				X	12-25
Masterson B-80*	023576				X	5-12
Masterson B-93*	033397				X	25-90
Sneed E-1*	023636				X	12-25
Bivins H-2*	NA				X	12-25
Warrick A-3	023659				X	25-90
Warrick A-5	023661				x	12-25
Bivins 6R	027058				X	25-90
Bivins 11R	027063				X	25-90
Bivins 20R	041307		X			25-90
Bivins 75R	063876				X	12-25
Bivins 85R	083289				X	25-90
Bivins A-160R	027071				X	12-25
Fee 3R	037776				X	12-25
Masterson 5R	027080				X	12-25
Masterson 58R	054640				X	12-25
Masterson-68R	056247				X	12-25
Masterson 85R	059783				X	12-25
Masterson B-100R	056961				X	12-25
Sneed 1 R	027095				X	12-25
Warrick 3R	027099		X			12-25
Warrick 4R	033522				X	12-25

\*Wells proposed for re-entry.

## Surface Soils

Soils in the area of the park are represented by several different soil series as described by the Natural Resource Conservation Service (formerly USDA Soil Conservation Service). The representative profile is a reddish brown, very fine sandy to clay loam to an approximate depth of 50 inches. This soil is well drained and is characterized by rapid permeability. The 45 natural gas wells and the proposed new well are predominantly located in areas of slight to moderate erodible soils.

Soils at well sites range from sandy loams along the western portion to clay loams on the eastern part above the creek bottom. The major soils series located within the well locations are classified as the Aspermont/Enterprise, Burson Stony Loam, Clairemont, Ector, Mobeetie, Quinlan, Tascosa, Veal, and Yomont Series as described by the Natural Resource Conservation Service and are outlined below. The soil units for each of the 45 existing wells and the proposed new well (Bivins H-2) are shown in Table 13.

***Aspermont Enterprise Series.*** The Aspermont/Enterprise soils are reddish brown and formed in alluvium or red bed materials and consist of deep, well-drained soils that formed in calcareous, loamy, colluvial red-bed sediment. These soils are located on foot soils below escarpments. The slopes range from 3 to 12%, but are generally 5 to 8%. In a representative profile, the top 34 inches is dark reddish brown to a reddish brown stratified with loam, clay loam, or silty clay loam. From 34 to 80 inches is red silty clay loam. Permeability of the Aspermont soil is moderate, and available water capacity is medium. Run-off is medium, the hazard of erosion on denuded areas is moderate, and the shrink-swell potential is low.

***Burson Stony Loam Series.*** The Burson Series consists of shallow to very shallow, calcareous, steep loamy soils. One or more strata of hardened limestone crops out in these areas. These soils formed in material derived from sandstone and siltstone. In a representative profile, the surface layer is yellowish-red weakly cemented sandstone and siltstone stratified with loam or silty clay loam. Burson soils are well drained to excessively drained. Permeability is moderate, and available water capacity is low. Burson soils have a pH of 7.9 to 8.4 and slopes range from 25 to 90%. The shrink-swell potential is low and the risk of corrosion of uncoated steel is low.

***Clairemont Series.*** The Clairemont series consists of deep, well-drained reddish brown soils that formed in calcareous loamy alluvium of red bed origin. Slopes are 0 to 2%. In a representative profile the top 60 inches is a yellowish red to reddish brown silty clay loam. Permeability of this soil is moderate, and available water capacity is high. Run-off is slow and the hazard of erosion is slight.

***Ector Series.*** The Ector Series consists of deep, dark grayish brown, well-drained soils that formed in calcareous loamy alluvium in valley fill and along the floodplains of small streams. Slopes are 0 to 3%. In a representative profile, the surface layer from 0 to 11 inches is brown or dark brown stratified gravelly loam or clay loam. Fractured limestone dominates from approximately 11 to 60 inches. Permeability of the surface layer is moderate and available water capacity is very low. Run-off is rapid and the hazard of erosion is severe in overgrazed or barren areas.

***Mobeetie Series.*** The Mobeetie Series consists of deep, well-drained, brownish soils that formed in calcareous loamy stream deposited sediments. Slopes range from 1 to 12%. In a representative profile, the surface layer to a depth of 60 inches is grayish brown to brown fine sandy loam. Soils in the Mobeetie Series generally have a moderately rapid permeability and a moderate available water capacity. Surface run-off is medium and the hazard of erosion is moderate.

***Quinlan Series.*** The Quinlan Series consists of shallow, well-drained, reddish brown soils formed in calcareous, weakly consolidated sandstone. These soils exist on side slopes and crests of knolls with slopes dominantly 8 to 30%. In a representative profile, the surface layer is red, yellowish red or reddish brown stratified with fine sandy loam, very fine sandy loam, or loam throughout and is calcareous. Quinlan soils are well drained and somewhat excessively drained. Permeability is moderate and available water capacity is very low. Runoff is rapid and the hazard of erosion is severe.

***Tascosa Series.*** The Tascosa Series consist of deep, calcareous, gravelly loam soils formed in stratified outwash beds of quartz gravel and sand. They are characterized as being deep, well-drained, gravelly soils formed in beds of water worn gravel and sand. Problems exist with seepage and piping during reclamation, and topsoil may have to be placed to encourage regrowth of vegetation. Because these soils are well-drained and their run-off is rapid, they have low available water in the upper part of the profile.

***Veal Series.*** The Veal Series consists of deep, well-drained soils on low hills and ridges that have gently sloping to sloping side slopes. Slopes are convex and range from 3 to 8%. The Veal soil is on ridgetops and upper side slopes. In a representative profile, the surface layer of the Veal Series is brown calcareous loam, moderately alkaline from 0 to 6 inches. A light brown clay loam exists from 6 to 14 inches. From approximately 14 to 60 inches, the soil is a pinkish gray calcareous loam. Soils in the Veal Series have a moderate permeability and a medium available water capacity. Surface run-off is medium and the hazard of erosion is severe in the areas of bare vegetation.

**Yomont Series.** The Yomont Series consists of deep, well-drained, nearly level soils on floodplains along major streams, which is subject to flooding one to two times per year. Flooding in this area is of short duration and has little effect to area vegetation. The Yomont soils are not uniform nor have a regular pattern. In a representative profile, the surface layer from approximately 0 to 36 inches is a reddish brown, very fine sandy loam. The underlying material from 36 to 60 inches is a reddish brown silty clay loam. Permeability of the Yomont soil is moderately rapid and the available water capacity is high. Surface run-off is slow and the hazard of erosion is slight.

**Table 13: Soil Units**

Well	Soil Units								
	Aspermont / Enterprise	Burson	Clairemont	Ector	Mobeetie	Quinlan	Tascosa	Veal	Yomont
Bivins A-29				X					
Bivins A-42				X					
Bivins A-46									X
Bivins A-49							X		
Bivins A-53		X							
Bivins A-136					X				
Bivins A-166	X								X
Bivins A-165									X
Bivins -206	X								
Bivins-208									X
Bivins H-1		X							
Fee A-2		X							
Masterson A-9		X							
Masterson B-3					X				
Masterson B-11		X				X			
Masterson B-13		X							
Masterson B-20		X						X	
Masterson B-23									X
Masterson B-25		X							
Masterson B-26		X	X						
Masterson B-29		X							
Masterson B-31				X					
Masterson B-51	X								
Masterson		X							

Well	Soil Units								
	Aspermont / Enterprise	Burson	Clairemont	Ector	Mobeetie	Quinlan	Tascosa	Veal	Yomont
B-73									
Masterson B-80	X	X							
Masterson B-93	X	X				X			
Sneed E-1							X		
Bivins H-2					X				
Warrick A-3					X				
Warrick A-5					X				
Bivins 6R		X							
Bivins 11R	X								
Bivins 20R	X								
Bivins 75R		X							
Bivins 85R		X							
Bivins A-160		X							
Bivins A-160R		X							
Fee 3R			X						
Masterson 5R	X								
Masterson 58R		X							
Masterson -68R		X							
Masterson 85R		X							
Masterson B-100R	X								
Sneed 1 R							X		
Warrick 3R			X						
Warrick 4R			X						

Problems associated with soils in the Lake Meredith area are generally related to soil texture (grain size) and slope. Unprotected areas are subject to soil blowing and water erosion. In the park, soil compaction, erosion, and slumping occur along roads, well pads, and flowlines. Erosion tends to increase where vegetation has been removed and cut and fill activities have occurred. Accelerated erosion is more prevalent on steeper slopes and other disturbed areas.

The lack of proper maintenance for oilfield access roads has resulted in severe erosion problems in some areas of the park. Most of the oilfield access roads are unsurfaced, are not adequately sloped, and lack drainage structures, such as culverts and ditches. During rainstorms, water flows down the road and erodes the surface of the road. In some areas, the overland flow of water has resulted in the formation of gullies on the roads and downslope from the roadways.

There are no filled chimneys or other unique geologic features within or near the existing 45 natural gas wells. However, the proposed new vertical well (Bivins H-2) and associated well pad are located

within the 300-foot designated SMA setback off the Dolomite Caprock. Although the area has been designated as the Dolomite Caprock, further groundtruthing of the area revealed that the Dolomite Caprock is not located where shown on the designated map area. Instead, the area is characterized as out-croppings of limestone, beyond which exists more surfaces at a slightly lower elevation. The area then flattens, rather than drops off, which is typical of the Dolomite Caprock. Although the well pad will be situated so that it intrudes as little as possible into the designated 300-foot setback area, it would intrude approximately 160 feet into the setback area. The well and associated well pad had to be placed within the 300-foot setback area to be in compliance with the Texas Railroad Commission's special field rule requirements to be 300 feet from the lease line.

### **3.2.2. Impacts of Alternative A, No Action, On Geology and Soil Resources**

**Analysis.** Under Alternative A, No Action, Pioneer would continue operating and maintaining 45 gas wells, pipelines and access roads within the park. No wells would be re-entered, and no additional wells would be drilled, resulting in no new impacts on geology and soil resources. The continuing operation of the 45 natural gas wells over the next 10 to 25 years, with associated use and maintenance of access roads, well pads, compressors, and flowlines would result in some continued impacts on geology and soils (110 acres). These actions could compact and rut soils, potentially increase surface run-off and erosion, and reduce soil permeability. The existing natural gas wellheads and appurtenant facilities, including access roads, are located in areas of relatively level terrain having slopes between 0 to 5% which help to reduce impacts. These continued actions would result in localized, short to long-term, minor, adverse impacts on geologic resources for the duration of operations.

Hydrocarbons, produced waters, or treatment chemicals could be released during production or transport, with potential minor to moderate adverse impacts. However, with mitigation included in this Alternative (see Section 2.1.1) and prompt response in the event of a spill, the intensity of adverse impacts would be negligible to minor. During reclamation operations, well plugging, shutting-down, and abandoning or removing production equipment and flowlines, and the use of heavy equipment and vehicles to recontour sites would cause soil erosion, and disturb and contaminate soils. However, mitigation would result in localized, short-term, negligible to minor, adverse impacts on soils around park or oil and gas developments.

Existing impacts on geology and soil resources would continue from the operation of 45 existing gas wells and their associated pipelines and access roads under its ratified Plan of Operations, resulting in localized, short to long-term, negligible to minor, adverse impacts on geology and soils within the park boundary. Access road maintenance would continue to be performed by Pioneer. Existing operations are not "grandfathered" from the 9B regulations and mitigation measures would be applied and impacts would be avoided or minimized to acceptable levels. Pioneer's ratified Plan of Operations includes a spill control plan, a reclamation plan and an affidavit by Pioneer to operate in compliance with all applicable Federal, State, and local laws and regulations. However, the ratified Plan of Operations does not specify that Pioneer would have to revegetate native species during reclamation to 70% cover, which ensures that soil erosion would be minimized. In addition, Under the ratified Plan of Operations, the operations and maintenance of access roads would not meet all of the requirements specified in the Final Oil and Gas Management Plan (April 2002).

**Cumulative Impacts.** Under Alternative A, No Action, cumulative impacts on geology and soils throughout the park would result from the continuing operation of nonfederal oil and gas operations within the park, park developments, future drilling and production of up to 85 new wells and associated access roads projected in the park's reasonably foreseeable development scenario on up to 150 acres. As some oil and gas operations are developed in the park, others would be plugged,

abandoned, and reclaimed; therefore, impacts would be distributed over time. Leaks and spills from oil and gas operations could result in localized, negligible to moderate, impacts on geology and soils. Park, commercial and recreational vehicle use along the access roads and off road vehicle use within the park would continue to compact and rut soils. Cumulative impacts on geology and soils throughout the park expected to be localized near developments, with short to long-term, negligible to minor, adverse impacts.

Reclamation of existing access roads and well pads within the parks would have beneficial impacts on soils and slopes. Recontouring and revegetating disturbed areas should reduce soil erosion and re-establish surface drainage flows.

Over time, protection provided to geologic resources in the park under the Oil and Gas Management Plan is expected to improve the condition of geology and soil resources. The cumulative effects of existing wells and roads, along with other actions that could affect soils and geology, would result in localized, short- to long-term, negligible to minor adverse impacts to geology and soil resources.

**Conclusion.** Under Alternative A, No Action, Pioneer would continue to operate and maintain the 45 existing gas wells and their associated pipelines and access roads; 22 of these wells would not be re-entered, and no additional wells would be drilled. The continuing operation of the 45 natural gas wells over the next 10 to 25 years, with associated use and maintenance of access roads, well pads, compressors, and flowlines, could compact and rut soils, potentially increase surface run-off and erosion, and reduce soil permeability, resulting in localized, short to long-term, negligible to minor, adverse impacts on geology and soil resources for the duration of operations. Existing operations are not “grandfathered” from the 9B regulations and mitigation measures would be applied and impacts would be avoided or minimized to acceptable levels. Pioneer’s ratified Plan of Operations includes a spill control plan, a reclamation plan and an affidavit by Pioneer to operate in compliance with all applicable Federal, State, and local laws and regulations. However, the ratified Plan of Operations does not specify that Pioneer would have to revegetate native species during reclamation to 70% cover, which ensures that soil erosion would be minimized. In addition, Under the ratified Plan of Operations, the operations and maintenance of access roads would not meet all of the requirements specified in the Final Oil and Gas Management Plan (April 2002).

Hydrocarbons, produced waters, or treatment chemicals could be released during production or transport, with negligible to moderate adverse impacts. However, with mitigation and prompt response in the event of a spill, the intensity of adverse impacts would be localized, short to long term, negligible to minor. The existing well pad areas were previously disturbed and no new impacts would occur.

Cumulative impacts from existing and future oil and gas operations in the park, park developments and operations, and visitor uses are expected to result in localized, short to long term, negligible to minor adverse impacts on geology and soils within the park. No impairment to geologic resources would result from implementation of this alternative.

### **3.2.3. Impacts of Alternative B, Plan of Operations with Mitigation, on Geology and Soil Resources**

**Analysis.** Under Alternative B, Proposed Action, Pioneer would continue operation of 45 existing wells and their associated pipelines and access roads; and, in addition would re-enter 22 of these gas wells and drill 1 new well. Existing impacts on geology and soils within the analysis area would be similar to Alternative A, No Action, with localized, long-term, negligible to minor, adverse impacts associated with vehicle use, and continuing operation and maintenance of pipelines and access

roads. Construction of the well/production pad, and flowline for the re-entry wells and one new well would require the leveling of 9 acres of land, resulting in direct adverse impacts including the long-term loss of soil productivity and localized, short-to long-term, negligible to minor, adverse impacts on geology and soils in the analysis area.

Mitigation measures to protect soils during the drilling and production phase of operations would include constructing a sloped well cellar and placing a 20-millimeter thick polyethylene liner under the pad that would extend over a berm surrounding the perimeter of the pad. These measures are intended to contain any spilled substances and prevent the downward percolation of any contaminants into native soil underlying the pad. With the application of these mitigation measures, particularly the use of a well pad liner to contain any leaks or spills of hydrocarbons and contaminating or hazardous materials from escaping into the environment, the construction, drilling and production operations would result in localized and long-term, negligible to minor adverse impacts on soils and geologic resources for the duration of operations, up to 10 to 25 years.

If the new well is placed in production, the well pad would be reduced and a flowline installed to connect with the existing pipelines located outside the park boundary. The site would be recontoured to natural conditions, and native vegetation re-established to meet 70% or better cover. The continued use of the site for production operations would result in localized, long-term, minor adverse impacts on geology and soils.

Flowline construction would disturb an addition 387 feet of soil. A temporary displacement of soils would occur until the flowline is being buried. Once the flowline is buried, soils would be replaced and the corridor would be revegetated. Adverse impacts on geology and soils from flowline placement would be localized, minor, and short-term during construction and revegetation activities.

Hydrocarbons, produced waters, or treatment chemicals could be released during drilling, production, or transport, with minor adverse impacts. However, with mitigation and prompt response in the event of a spill, the intensity of adverse impacts would be negligible to minor. During reclamation operations, well plugging, shutting-down, and abandoning/removing production equipment and flowlines, and the use of heavy equipment and vehicles to recontour sites would cause soil erosion and disturb and contaminate soils. However, mitigation would result in localized, short-term, negligible to minor adverse impacts on soils.

The Plan of Operations, as submitted, includes the following:

- A spill control plan and an affidavit by Pioneer to operate in compliance with all applicable Federal, State, and local laws and regulations.
- A mitigation measure for revegetation of native species during reclamation to 70% or better, which ensures that soil erosion would be minimized.
- Adherence to the NPS's SOP for the Construction and Maintenance of Oil and Gas Access Roads in Lake Meredith National Recreation Area and Alibates Flint Quarries would ensure that soil erosion would be minimized.
- Mitigation measures for Bivins H-2 well, since the well pad and construction area would be located approximately 160 feet from the Dolomite Caprock. In order to prevent any entry beyond this area, a barricade would be set up to prevent vehicles and personnel from

entering the area, eliminating impacts to the Alibates Dolomite Caprock during drilling and operations. The location of the well pad was oriented so that it caused the least intrusion within the 300-foot setback SMA of the Dolomite Caprock.

These elements, in addition to the previous requirements for Pioneer to tender a performance bond, would ensure minimizing further degradation of park resources and rapid response in the event of a leak or spill, thereby providing better assurance that adverse impacts on geologic resources would be minimized.

**Cumulative Impacts.** Under Alternative B, Proposed Action, cumulative impacts on geology and soils throughout the park would be similar to those described under Alternative A, No Action, with an increase of surface disturbance of 9 acres and added protection of mitigation measures. Overall, impacts from existing and future oil and gas operations in the park, park developments and operations, would result in localized, short to long-term, negligible to minor adverse impacts near developments.

**Conclusion.** Under Alternative B, Proposed Action, Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and in addition, would re-enter 22 of these gas wells and drill 1 new vertical well. Under the proposed action, the mitigation measures to adhere to the NPS's SOP for the Construction and Maintenance of Access Roads and to revegetate with native species during reclamation to 70% ensures that soil erosion would be minimized. For drilling new well (Bivins H-2) only the well pad would be located within the 300-foot setback of the Alibates Dolomite Caprock. With mitigation, constructing the well/production pad, and drilling and producing the wells, would result in localized, short- to long-term, negligible to minor direct and indirect adverse impacts on geology and soil resources.

Cumulative impacts on geologic resources throughout the park would be localized, short to long-term, negligible to minor and adverse around park and oil and gas developments. No impairment to geology and soil resources would result from implementation of this alternative.

### 3.3. Floodplains

#### Methodology

To analyze the impacts on floodplains, all available information on the estimated 100-year and 500-year floodplains in the park was compiled including: surveys, consultation with other agencies, the park's approved Oil and Gas Management Plan, and other park documents.

The thresholds of change for the intensity of an impact are defined as follows:

#### Impact Intensity Threshold Criteria:

- |                    |  |
|--------------------|--|
| <b>Negligible:</b> | Floodplains would not be affected, or changes would be either non-detectable or, if detected, would have effects that would be considered slight, local, and would likely be short-term. No U.S. Army Corps of Engineers 404 permit would be necessary.  |
| <b>Minor:</b>      | Changes in floodplains would be measurable, although the changes would be small, would likely be short-term, and the effects would be localized. No mitigation measure associated with water quality or hydrology would be necessary. A U.S. Army Corps of Engineers 404 permit would not be required. |

- Moderate:** Changes in floodplains would be measurable and long term but would be relatively local. Mitigation measures associated with water quality or hydrology would be necessary and the measures would likely succeed. A U.S. Army Corps of Engineers 404 permit would be required.
- Major:** Changes in floodplains would be readily measurable, would have substantial consequences, and would be noticed on a regional scale. Mitigation measures would be necessary and their success would not be guaranteed. A U.S. Army Corps of Engineers 404 permit would be required.

### 3.3.1. Affected Environment

Floodplains are defined as relatively flat, lowland areas adjoining inland and coastal waters. The estimated 100-year floodplain is an area that is subject to a 1.0% or greater chance of flooding in any given year. The estimated 500-year floodplain is an area that is subject to a 5.0% or greater chance of flooding in any given year. Within the boundaries of Lake Meredith National Recreation Area, only the 100-year floodplains for Potter and Hutchinson Counties have been mapped by the Federal Emergency Management Agency (FEMA) on Flood Insurance Rate Maps (FIRM). However, the Bureau of Reclamation (BOR) has calculated estimated flood elevations that would result from the inflow of 100- and 500-year flood hydrographs. These estimated 100-year and 500-year flood elevations straddle the flood control pool elevation at 2,948 and 2,972 feet, respectively.

Protection of floodplains is provided for in the NPS Floodplain Management Guidelines, Special Directive 93-4, which requires that the NPS recognize and manage for the preservation of floodplain values, in order to minimize potentially hazardous conditions associated with flooding, and to adhere to all federally mandated laws and regulations pertaining to the management of activities in flood-prone areas.

Before an operator is permitted to undertake an action, it would be necessary to verify if the proposed action would occur within a regulatory floodplain. This determination would be made based on the best available hydraulic information, with the FIRM (Fire Insurance Rate Map) considered the minimal level of information. In the absence of FIRM, the operator would complete an appropriate hydrologic and hydraulic analysis to determine the location of the estimated 100-year and 500-year floodplains within its operations area.

Based on topographic surveys, and review of the park's Final Oil and Gas Management Plan EIS, the following existing wells and wells proposed for re-entry are located within the estimated 100-year floodplain (below 2948'): Masterson B-13, Masterson B-23, and Masterson B-25. In addition, the following existing well locations proposed for re-entry are located within the 500-year floodplain (2948' to 2972'): Bivins A-46, Bivins A-53, Masterson B-26, and Masterson B-31. These wells all have a cover on their drip stations to prevent spills of hydrocarbons and brine that collects in the drips. In addition, no hazardous materials are stored at the well locations.

### 3.3.2. Impacts of Alternative A, No Action, on Floodplains

**Analysis.** Under Alternative A, No Action, Pioneer would not re-enter 22 of the existing gas wells, nor drill one new vertical well; therefore, there would be no new impacts on floodplains associated with these activities and no new surface disturbance would occur in the floodplains. Three existing wells (Masterson B-13, Masterson B-23, and Masterson B-25) are located within the estimated 100-year floodplain (below 2948') and four wells (Bivins A-46, Bivins A-53, Masterson B-26, and Masterson B-31) are located within the 500-year floodplain (2972' to 2948'). Existing impacts on

floodplains would continue from the operation of these eight existing gas wells and their associated pipelines and access roads located within the floodplain. Only a wellhead and meter house are located at these locations, and no hazardous materials are stored there. Since production operations could last for 10 to 25 years, the potential for leaks and spills of hazardous or contaminating substances from production operations is greater than for any other phase of oil and gas development. Ruptures of flowlines can be caused by corrosion of the pipe, or from failure of a flange, valve, or seal. Because flowlines are generally a smaller diameter (4" to 6" in diameter), and under little pressure, the potential for release of hydrocarbons and produced water from flowlines pose the potential for smaller releases in comparison to the large diameter transpark pipelines that are under substantially more pressure.

Under Alternative A, operations and maintenance would not meet all the floodplain requirements specified in the Final Oil and Gas Management Plan (April 2002) for erosion control measures, secondary containment, routine maintenance of access roads, wellpads and equipment, reclamation, and development of emergency flooding procedures. The current operations are not grandfathered from 9B regulations and would be subject to mitigation measures to reduce impacts. Under 9B regulations and in the ratified Plan of Operations, no provisions have been made for operating within an estimated 100-year or 500-year floodplain. Therefore, adverse impacts to floodplains would be localized, short to long-term, and minor in operation areas occurring within the floodplain.

**Cumulative Impacts.** Under Alternative A, No Action, the wells would not be re-entered or drilled, and there would be no contribution to cumulative impacts on floodplains. Cumulative impacts on the park's floodplains are the result of direct impacts from existing oil and gas wells, production facilities, and pipelines; future exploration and development of wells projected, park developments and operations, and visitor use in the estimated 100-year floodplain. Approximately 42% of the park (22,535 acres) is currently located within the estimated 500-year floodplain and approximately 41% of the park (19,170 acres) is located below the estimated 100-year floodplain. Clean-up activities at several existing and abandoned oil and gas sites are proceeding in order to remove or remediate hydrocarbon and heavy metal contamination. Additional incidents of leaks and spills of hydrocarbons and contaminating or hazardous substances could occur in the future. Other activities that could impact floodplains parkwide include routine maintenance of park roads; park, commercial and recreational vehicle use; and recreational activities. Cumulative impacts on park floodplains are expected to result in localized, short- to long-term, negligible to minor, adverse impacts around park or oil and gas developments.

**Conclusion.** Under Alternative A, No Action, Pioneer would not re-enter 22 of the existing gas wells, nor drill one new vertical well; therefore, there would be no new impacts on floodplains associated with these activities. Three of the existing well sites are located within the estimated 100-year flood elevation and five of the existing well sites are located within the estimated 500-year flood elevation. Existing impacts on floodplains would continue from the operation and maintenance of the eight existing gas wells and pipelines and access roads located within the estimated floodplains under their ratified Plan of Operations. Because operations and maintenance would not meet all the floodplain requirements for erosion control measures, secondary containment, and routine maintenance of access roads, wellpads and equipment, reclamation, and development of emergency flooding procedures as specified in the Final Oil and Gas Management Plan (April 2002); continued operation and maintenance would result in localized, short to long-term, minor, adverse impacts on floodplains. Cumulative impacts on floodplains throughout the park would be localized, short- to long-term, negligible to minor, and adverse. No impairment to floodplains would result from implementation of this alternative.

### 3.3.3. Impacts of Alternative B, Plan of Operations with Mitigation, on Floodplains

**Analysis.** Under Alternative B, impacts would be similar to those described under Alternative A, but will less potential for even minor impacts due to increased mitigation. Three wells proposed for re-entry (Masterson B-13, Masterson B-23, and Masterson B-25) are located within the estimated 100-year floodplain (below 2948') and four wells (Bivins A-46, Bivins A-53, Masterson B-26, and Masterson B-31) proposed for re-entry are located within the 500-year floodplain (2972' to 2948'). The proposed new well (Bivins H-2) is located outside any floodplain area. The Plan of Operations, as submitted, includes procedures for erosion control measures, secondary containment, and routine maintenance of access roads, well pads and equipment for all current operations located within the 100-year and 500-year floodplains. Storage tanks and drip tanks are currently covered. Mitigation measures also include development of emergency flooding procedures. In addition, a spill control plan and an affidavit by Pioneer to operate in compliance with all applicable Federal, State, and local laws and regulations were prepared. These measures, in addition to the existing performance bond, would ensure rapid response in the event of a leak or spill, thereby providing better assurance that adverse impacts on floodplains would be minimized. Because the proposed action is located with a regulatory floodplain, a Statement of Findings (SOF) as required by the NPS's Procedural Manual #77-2; Floodplain Management was prepared by the park (Appendix A). In addition, a mitigation measure to adhere to the NPS's SOP for the Construction and Maintenance of Oil and Gas Access Roads in Lake Meredith National Recreation Area and Alibates Flint Quarries NM would ensure that soil erosion would be minimized. The mitigation measure to revegetate with native species during reclamation to 70% ensures that soil erosion would be minimized and sedimentation of floodplains would be avoided or minimized. As a result of applying these and other mitigation measures, construction, drilling and production operations would result in localized, short-to long-term, negligible adverse impacts on floodplains.

**Cumulative Impacts.** Under Alternative B, Proposed Action, cumulative impacts on floodplains would be similar to those described under No Action with added protection of mitigation measures. The proposed action, plus other actions in the park's estimated floodplains, would result in short- to long-term, negligible to minor adverse impacts in the localized areas around park and oil and gas developments.

**Conclusion.** Under Alternative B, Proposed Action, eight of the wells proposed for re-entry are located within a regulatory floodplain. The Plan of Operations, as submitted, includes procedures for erosion control measures, secondary containment, and routine maintenance of access roads, well pads and equipment for all current operations located within the 100-year and 500-year floodplains. Storage tanks and drip tanks are currently covered. Mitigation measures also include development of emergency flooding procedures, a spill control plan and an affidavit by Pioneer to operate in compliance with all applicable Federal, State, and local laws and regulations were prepared. These measures, in addition to the existing performance bond, would ensure rapid response in the event of a leak or spill, thereby providing better assurance that adverse impacts on floodplains would be minimized. Because the proposed action is located with a regulatory floodplain, a Statement of Findings (SOF) as required by the NPS's Director's Order 77-2; Floodplain Management was prepared by the park. In addition, a mitigation measure to adhere to the NPS's SOP for the Construction and Maintenance of Oil and Gas Access Roads in Lake Meredith National Recreation Area and Alibates Flint Quarries NM would ensure that soil erosion would be minimized. As a result of applying these and other mitigation measures, construction, drilling and production operations would result in localized, short-to long-term, negligible adverse impacts on floodplains. Cumulative impacts on floodplains would be similar to those described under Alternative A, No Action, with an increase of surface disturbance of 9 acres and added protection of mitigation measures; resulting in short- to long-term, negligible to minor adverse impacts in the localized areas around park or oil and

gas developments in the floodplains. No impairment to floodplains would result from implementation of this alternative.

As required by NPS Director's Order 77-2, Floodplain Management, the park will provide the draft floodplain statement of findings to various state and federal agencies and also make it available along with the plan of operations and environmental assessment for public review.

### 3.4. VEGETATION

#### Methodology

To analyze the impacts on vegetation, all available information on vegetation in the park was compiled including park-specific research, other park plan, the park's approved Oil and Gas Management Plan, personal observations, consultation with other permitting agencies, and the survey completed by Wes Phillips.

The thresholds of change for the intensity of an impact are defined as follows:

- Negligible:** An action that could result in a change to a population or individuals of a species or a resource, but the change would be so small that it would not be of any measurable or perceptible consequence.
- Minor:** An action that could result in a change to a population or individuals of a species or a resource. The change would be small and of little consequence.
- Moderate:** An action that could result in a change to a population or individuals of a species or a resource. The change would be measurable and of consequence to the species or resource.
- Major:** An action that would have a noticeable change to a population or individuals of a species or a resource. The change would be measurable and result in a severely adverse or major beneficial impact, or possible permanent consequence, upon the species or resource.

#### 3.4.1. Affected Environment

The following is a description of the major vegetation types within the park and within the proposed project well pad areas. A biological survey was conducted for the proposed well pad construction areas through the park by Mr. Wes Phillips in March 2002 and in March 2003. The survey focused specifically on the areas where construction would occur and in the immediate areas surrounding each of the wells, including new and re-entry locations.

The vegetation of the park is relatively sparse, due to soil and climatic conditions. Constant winds and high temperatures contribute to high evaporative rates, which reduce the effectiveness of precipitation for plant growth, which consists primarily of grasses and drought-tolerant shrubs. The vegetation at the existing well locations consists primarily of mesquite shrub grassland, with ragweed as the most common herbaceous plant and yucca and sand sage as the most common shrubs. Grasses are abundant, and include a dozen different species. The most common grasses in the well areas are annual wild buckwheat (*Eriogonum annuum*), blue grama (*Bouteloua gracilis*), mesquite (*Bouteloua oligostachya*), ragweed (*Ambrosia psilostachya*), sand dropseed (*Sporobolus cryptandra*), sawleaf daisy (*Prionopsis ciliate*), three awn grass (*Aristida spp.*), little bluestem (*Schizachyrium scoparium*), sand bluestem, (*Andropogon hallii*), hairy grama (*Bouteloua hirsuta*), and silverleaf nightshade (*Solanum eleagnifolium*). A stand of soapberry (*Jaboncillo sapindus drummondii*) is

located adjacent to the well pad at Masterson A-9. Other common plants are summarized in the table found in Appendix B.

No endangered or threatened plants exist within the boundaries of the parks. There is one state-listed rare vascular plant known to occur in Potter County, but it is not known or expected at any of the well sites.

In 1999, landcover in the park was classified by NPS, with involvement by the U.S. Geological Survey, National Wetlands Research Center, Lafayette, Louisiana, into 11 cover types that include major vegetation types, water, bare land, and urban (developed) areas. The Landcover Classification used the park boundary map that was derived from rudimentary survey methods of the 1940s and early 1950s. As shown in Table 14, 11 cover types have been classified, which include major vegetation types, water, and bare land, and urban (developed) areas.

**Table 14: Land Classification Type and Percentage,  
Lake Meredith National Recreation Area**

Land Classification Type	Acres*	Percentage Of Park
Water	10,547.86	25.39
Yucca Grassland	4,382.83	10.55
Mesquite Grassland	2,820.79	6.79
Mixed Grassland	5,263.54	12.67
Vegetated Cliffs	8,674.26	20.88
Disturbed Grassland	469.44	1.13
Riverine Grassland	2,056.40	4.95
Emergent Vegetation	764.40	1.84
Emergent Scrub/Shrub	1,370.93	3.30
Unconsolidated Shore	195.25	0.47
Mixed Forest	4,033.86	9.71
Bare Land	951.34	2.29
Urban	12.46	0.03
<b>Total</b>	<b>41,543.36</b>	<b>100.00</b>

SOURCE: NPS 2002b.

\*Acres are derived from the existing Lake Meredith boundary map, which does not account for approximately 3,434 acres (7.6%) of the park's administered land.

The existing wells and the new well location are located within one of five different landcover classifications. The land cover classification for each the 45 existing wells and proposed new well location is shown in Table 15.

Table 15: Well Landcover Classification Type

Well	RRC	Yucca Grass Land	Mesquite Grass land	Mixed Grass Land	Riverine Grass Land	Bare Land
Bivins A-29	023299			X		
Bivins A-42	023311			X		
Bivins A-46	023315			X		
Bivins A-49	023318			X		
Bivins A-53	023322		X			
Bivins A-136	023399			X		
Bivins A-160	023418			X		
Bivins A-165	033025	X				
Bivins A-166	033026			X		
Fee A-2	023455			X		
Bivins A-206	169635	X				
Bivins A-208	169413	X				
Bivins H-2			X			
Masterson A-9	023487			X		
Masterson B-3	023511			X		
Masterson B-11	023515		X			
Masterson B-13	023517					Pad ripped
Masterson B-20	023524	X	X			
Masterson B-23	023527		X			
Masterson B-25	023529		X			
Masterson B-26	023530		X			
Masterson B-29	023533			X	X	
Masterson B-31	023535			X		
Masterson B-51	023553			X		
Masterson B-73	023572	X		X		
Bivins H-2	NA	X				
Masterson B-80	023576			X		
Masterson B-93	033397		X			
Sneed E-1	023636			X		
Warrick A-3	023659	X				
Warrick A-5	023661	X				
Bivins 6R	027058	X				
Bivins 11R	027063	X				
Bivins 20R	041307	X				
Bivins 75R	063876	X				
Bivins 85R	083289			X		
Bivins A-160R	027071	X				
Fee 3R	037776	X				
Masterson 5R	027080	X				
Masterson 58R	054640		X			
Masterson-68R	056247		X			
Masterson 85R	059783		X			
Masterson B-100R	056961		X			
Sneed 1 R	027095			X		
Warrick 3R	027099	X				
Warrick 4R	033522	X				

A description of the vegetative classifications that occur at the well locations is provided below.

- **Yucca Grassland.** The yucca grasslands are densely vegetated with mesquite, small soapweed, yucca, blue stem grass, grama grasses, purple threeawn grass, and others, with predominant larger vegetation of yucca.

- **Mesquite Grassland.** Mesquite grasslands are densely vegetated areas comprising small soapweed yucca, blue stem grasses, grama grasses, purple threeawn, and others, dominated by mesquite.
- **Mixed Grassland.** The mixed grasslands areas are densely vegetated with mesquite, small soapweed yucca, blue stem grasses, purple threeawn, and others. Mixed large vegetation may include mesquite, yucca, or other woody plants.
- **Disturbed Grassland.** Disturbed grasslands are sparsely vegetated with switch grass, common reed, seep willow baccharis, salt cedar, yellow or white sweet clover, and others.
- **Riverine Grassland.** The riverine grasslands are densely vegetated with switch grass, common reed, seep willow baccharis, salt cedar, yellow or white sweet clover, and others.

**Rare and/or Imperiled Plant Communities of Texas.** The State of Texas Natural Heritage Program maintains a list of Plant Communities of Texas. Protection of plant communities, particularly rare or imperiled plant communities, is important because they provide biological diversity, aesthetics, nutrient cycling, gene-banks, and food and shelter for both migrating and resident wildlife. Such plant communities are also important for future science and technological discovery. Five plant communities are likely to occur in the park: Blue Grama-Buffalo Community, Cottonwood-Tallgrass Community, Oneseed Juniper Community, Redberry Juniper-Midgrass Community, and the Sideoats Grama Series. Three of the plant communities are classified by the State of Texas as rare, or imperiled globally in the state: Blue Grama-Buffalograss Community, Cottonwood-Tallgrass Community, and the Sideoats Grama Series.

During the survey conducted by Wes Phillips, each well location was observed to determine if any of the rare or imperiled plant communities was located near or adjacent to the well pad. Only one well location had an imperiled community near the site: a Cottonwood Tallgrass community was located directly adjacent to Masterson A-9. This community includes Cottonwoods and grass species such as big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), gamagrass (*Tripsacum dactyloides*), Indiangrass (*Sorghastrum nutans*), and alkali sacaton (*Sporobolus airoides*). Cottonwoods located in undeveloped areas of the park provide important sites for nesting rookeries by great blue herons, black-crowned night herons, and cormorants. Care will be taken to ensure that no soil from construction activity drifts onto this community. It is recommended that a fence be placed three or more feet from the drop-off into this community to keep heavy equipment out of the imperiled area.

#### 3.4.2. Impacts of Alternative A, No Action, on Vegetation

Under Alternative A, No Action, the wells would not be reentered and the new well would not be drilled, resulting in no new impacts on vegetation. However, the continuing operation and maintenance of the 45 existing natural gas wells (including access roads, well pads, and compressors) under Pioneer's ratified Plan of Operation, would result in the continuing direct loss of 110.27 acres of vegetation in these areas

Over the long-term operation of the pipelines/flowlines, occasional disturbance of vegetation within the flowline corridors could occur as a result of continued maintenance, including access over the corridor by truck to inspect surface equipment, and on occasion excavating a section of the flowline to inspect the integrity of the line. The potential for leaks and spills exists during all phases of oil and gas operations, resulting in impacts that could be serious on a very local level, with minor to

potentially major, short-term adverse impacts on vegetation; however, with the mitigation measures included with this alternative, the intensity of impacts would be reduced to negligible to minor.

Well plugging, shutting down, and abandoning or removing flowlines, and use of heavy equipment and vehicles to recontour sites could result in accidental releases of oil and other contaminating and hazardous substances, which could harm or kill vegetation. However, the application of mitigation measures, including the careful use of NPS-approved herbicides, would result in localized, short- to long-term, negligible to minor adverse impacts on vegetation.

Direct and indirect impacts on vegetation could occur as a result of the introduction of exotic vegetation resulting from the placement of fill material or the use of construction equipment. However, with the mitigation measures included with this alternative, the potential for and intensity of impacts would be reduced to minor.

Pioneer's ratified Plan of Operations, includes a reclamation plan, a spill control plan, and an affidavit by Pioneer to operate in compliance with all applicable Federal, state, and local laws and regulations. These elements, in addition to Pioneer's previous requirement to tender a performance bond, would ensure rapid response in the event of a leak or spill, thereby providing better assurance that adverse impacts on vegetation would be minimized. However, under Alternative A, there are no mitigation measures to adhere to the NPS's SOP for the Construction and Maintenance of Oil and Gas Access Roads in Lake Meredith National Recreation Area and Alibates Flint Quarries NM that would ensure that soil erosion would be minimized. In addition, the current reclamation plan does not provide a goal to establish native vegetation cover to 70%, ensuring the long-term revegetation success of the operations areas, and better assurance that rare/imperiled Plant Communities of Texas would be perpetuated through natural introduction and succession. The continued operation and maintenance would result in localized, minor to moderate, direct and indirect, adverse impacts on vegetation for the duration of the existing operations (up to 10 to 25 years), until the wells are plugged and the pads, flowlines, and access roads are reclaimed.

**Cumulative Impacts.** Under Alternative A, No Action, cumulative impacts on vegetation throughout the park could result from the continuing operation of 173 non federal oil and gas operations within the park on 82 acres, current park development, and future drilling and production of up to 85 wells project in the park's reasonably foreseeable development scenario on up to 150 acres. As some oil and gas operations are developed in the park, others would be plugged, abandoned, and reclaimed; therefore, impacts would be distributed over time. Other park activities that could contribute to impacting vegetation parkwide include prescribed fires, routine maintenance of park roads, and park and visitor vehicle use, and recreational activities.

Existing future development of oil and gas-related roads, pads and flowlines within the park could directly and indirectly impact vegetation. Leaks and spills from oil and gas operations could be serious, with localized, short to long-term, minor to potentially moderate, adverse impacts on vegetation; however, with the mitigation measures included in the operators' Plans of Operations, and prompt response in the event of a spill, the intensity of impacts are reduced to negligible to minor.

The cumulative impacts on vegetation throughout the park are expected to result in localized, short to long-term, negligible to moderate, direct and indirect adverse impacts near developments throughout the park.

**Conclusion** Under Alternative A, No Action, the wells would not be re-entered and the new well would not be drilled, resulting in no new impacts on vegetation. However, the continuing operation

and maintenance of the 45 existing natural gas wells under Pioneer's ratified Plan of Operations, (including access roads, well pads, and compressors) would result in the continuing direct loss of approximately 110 acres of vegetation in these areas. These existing operations are not "grandfathered" from the 9B regulations; therefore, mitigation measures would be applied and impacts would be avoided or minimized to acceptable levels. However, operations and maintenance would not meet all of the requirements specified in the Final Oil and Gas Management Plan (April 2002). The continued operation and maintenance would result in localized, minor to moderate, direct and indirect, adverse impacts on vegetation for the duration of the existing operations (up to 10 to 25 years), until the wells are plugged and the pads, flowlines, and access roads are reclaimed.

Cumulative impacts from existing future oil and gas operation in the park, routine park operations, and visitor uses are expected to result in localized, short to long-term, negligible to moderate, direct and indirect adverse impacts in the localized areas around park on oil and gas developments. No impairment to vegetation would result from implementation of this alternative.

### **3.4.3. Impacts of Alternative B, Plan of Operations with Mitigation, on Vegetation**

**Analysis.** Under Alternative B, Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and in addition, would re-enter 22 of these gas wells and drill 1 new vertical well resulting in a direct additional loss of approximately 9 acres (total 119.27 acres for all) during the duration of operations (up to 10 to 25 years), and until the wells are plugged and the pads, flowlines, and access roads are reclaimed. If the new well does not go into production, the initial disturbance to construct the well pad on 1 acre would be reclaimed.

Over the long-term operation of the pipelines/flowlines, occasional disturbance of vegetation within the flowline corridors could occur as a result of continued maintenance, including access over the corridor by truck to inspect surface equipment, and on occasion excavating a section of the flowline to inspect the integrity of the line.

The potential for leaks and spills exists during all phases of oil and gas operations, resulting in impacts that could be serious on a very local level, with minor to potentially major, short-term adverse impacts on vegetation; however, with the mitigation measures included with this alternative, the intensity of impacts would be reduced to negligible to minor. Mitigation measures during drilling include constructing a sloped well cellar, and lining the pad with a 20 millimeter thick polyethylene liner that would extend over a 3'-high berm surrounding the perimeter of the pad. These measures are intended to contain any spilled substances and prevent the downward percolation of any contaminants.

Well plugging, shutting down, and abandoning or removing flowlines, and use of heavy equipment and vehicles to recontour sites could result in accidental releases of oil and other contaminating and hazardous substances, which could harm or kill vegetation. However, the application of mitigation measures, including the application of secondary spill containment to prevent the release of any leaked or spilled hydrocarbons and contaminating or hazardous substances into the adjacent vegetation communities, preventing the introduction of exotic plant species, and careful use of NPS-approved herbicides, would result in localized, short- to long-term, negligible to minor adverse impacts on vegetation.

Direct and indirect impacts on vegetation could occur as a result of the introduction of exotic vegetation resulting from the placement of fill material or the use of construction equipment. However, with the mitigation measures included with this alternative, the potential for and intensity of impacts would be reduced to minor.

The Plan of Operations, as submitted, includes a reclamation plan, a spill control plan, and an affidavit by Pioneer to operate in compliance with all applicable Federal, state, and local laws and regulations. These elements, in addition to Pioneer's previous requirement to tender a performance bond, would ensure rapid response in the event of a leak or spill, thereby providing better assurance that adverse impacts on vegetation would be minimized. Under Alternative B, a mitigation measure to adhere to the NPS's SOP for the Construction and Maintenance of Oil and Gas Access Roads in Lake Meredith National Recreation Area and Alibates Flint Quarries NM would ensure that soil erosion would be minimized. Also, the reclamation plan goal to establish native vegetation cover to 70%, ensuring the long-term revegetation success of the operations areas, and better assurance that rare/imperiled Plant Communities of Texas, would be perpetuated through natural introduction and succession.

**Cumulative Impacts.** Under Alternative B, Proposed Action, cumulative impacts on vegetation would be similar to those described under Alternative A, with the addition of 9 acres of disturbance as a result of well pad expansions and the new well (Bivins H-2). However, and adhering to the Oil and Gas Management Plan will provide added protection, resulting in localized, short- to long-term, negligible to minor, direct and indirect, adverse impacts in the localized areas around park or oil and gas developments.

**Conclusion.** Under Alternative B, Proposed Action, Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and, in addition, would re-enter 22 of 45 existing gas wells and drill 1 new vertical well resulting in an additional disturbance of approximately 9 acres for a total disturbance of 119.27 acres.

Under the proposed action, the mitigation measure to revegetate with native species during reclamation to 70% ensures that vegetation would be restored. With mitigation, constructing the well/production pad, and drilling and producing the wells, would result in localized, short- to long-term, negligible to minor direct and indirect adverse impacts on vegetation.

Cumulative effects would be similar to those described under Alternative A, No Action, with an increase of surface disturbance of 9 acres and added protection of mitigation measures resulting in localized, short- to long-term, negligible to minor, direct and indirect, on vegetation in the park. No impairment to vegetation would result from implementation of this alternative.

### 3.5. WILDLIFE

#### Methodology

To analyze the impacts on wildlife, all available information on wildlife in the park was compiled including park specific research, other park plans, the park's approved Oil and Gas Management Plan, personal observations, and consultation with other permitting agencies.

The thresholds of change for the intensity of an impact are defined as follows:

**Negligible:** An action that could result in a change to a population or individuals of a species or a resource, but the change would be so small that it would not be of any measurable or perceptible consequence.

**Minor:** An action that could result in a change to a population or individuals of a species or a resource. The change would be small and of little consequence.

- Moderate:** An action that could result in a change to a population or individuals of a species or a resource. The change would be measurable and of consequence to the species or resource.
- Major:** An action that would have a noticeable change to a population or individuals of a species or a resource. The change would be measurable and result in a severely adverse or major beneficial impact, or possible permanent consequence, upon the species or resource

### 3.5.1. Affected Environment

Lake Meredith National Recreation Area provides important habitat for wildlife in the region, especially species dependent on water. The area lies within a major migratory bird corridor. Reservoirs, playa lakes, and the river systems are used as important stopover points during migration. No recent biological surveys have been completed on terrestrial wildlife species, but inventories of mammals, reptiles, amphibians, and birds were completed between the late 1970s and late 1980s. According to these inventories and other known information about the area, the following species are believed to be native to the parks: 60 species of mammals, 15 species of fish, 32 species of reptiles, 11 species of amphibians, and over 200 species of birds (NPS, 1998) Common wildlife species known to occur in and around the park are discussed in the following sections.

**Mammals.** The National Park Service estimates that 60 species of mammals occur in Lake Meredith National Recreation Area. The major species of wildlife in the park includes mule deer (*Odocoileus virginiana*), white-tailed deer (*Odocoileus virginianus*), and coyote (*Canis latrans*). Populations of smaller mammals, such as porcupine (*Erethizon dorsatum*), raccoon (*Procyon lotor*), skunks (*Spilogale putorius*, *Mephitis mephitis*), ground squirrels (*Spermophilus tridecemlineatus*), rabbits (*Sylvilagus audubonii*, *Sylvilagus floridanus*, *Lepus californicus*), pocket gopher (*Geomys bursarius*), mole (*Scalopus aquaticus*), a few bats, and several varieties of rats and mice occur on a relatively permanent basis.

During the site visit, signs of the desert cottontail, pocket gopher, eastern mole, coyote, ground squirrel, kangaroo rat, rough harvester ant, cattle, and woodrat were present at the following wells: Bivins A-46, Bivins A-136, Bivins A-208, Masterson A-9, Masterson B-3, Masterson B-11, Masterson B-23, Masterson B-25, Masterson B-31, Masterson B-73, Masterson B-93, and Sneed E-1. The eastern fence lizard and rock wren were observed at the well sites Bivins A-46 and Bivins A-136, respectively.

**Birds.** Over 200 species of birds are present at Lake Meredith. Lake Meredith exists along the Central Flyway, and large numbers of ducks, geese, and other migratory birds occur seasonally. Migratory birds use open water areas or wetlands from fall to spring. Migratory waterfowl use open water wetland areas below the stilling basin.

Prominent birdlife consists of wild turkey (*Meleagris gallopavo*), bobwhite (*Colinus virginianus*), scaled quail (*Callipepla squamata*), mourning dove (*Zenaidura macroura*), roadrunner (*Geococcyx californianus*), and red-winged blackbird (*Agelaius phoeniceus*). Other migratory waterfowl use open water wetland areas below the Stilling Basin. Common migratory waterfowl include mallards (*Anas platyrhynchos*), blue and green winged teals (*Anas discors*, *Anas crecca*), the common golden eye (*Bucephala clangula*), and great blue heron (*Ardea herodias*). Additional birds commonly seen include willets, wrens, yellowlegs, bitterns, moorhens, coots, gulls, terns, pie-billed and horned grebes, yellow-throated warbler, black-crowned night heron, yellow-crowned night heron, and

several species of swallows. Hawks are known to frequent areas below the Stilling Basin (Spring Canyon).

Great blue herons are common year-round residents at the lake; however, the one rookery area in Lake Meredith is well away from established roadways. None of the 45 existing natural gas wells or the proposed new well location are located near the rookery.

Reptiles and Amphibians. Eleven amphibian species and 32 reptile species are found at Lake Meredith. Reptiles and amphibians are considered as indicators of aquatic health because they are sensitive to pollution and loss of habitat. They are important in the food chain and comprise a large portion of the vertebrate population in certain ecotypes. Turtles, lizards, and snakes, including two poisonous species (prairie rattlesnake and diamondback rattlesnake), can be found in the park. Although these species were not observed during the site visit at any of the well locations proposed for re-entry or at the new well location, it is probable that these reptiles are likely to occur at or near the well sites. During well pad or pipeline construction they may be hiding in the shade.

Game Species. Hunting is permitted in the following areas of Lake Meredith National Recreation Area: Plum Creek, Blue West, Big Blue Creek, Bugbee, the Triangle, Alibates, McBride and Mullinaw Canyons, Big Canyon, Saddle Horse Canyon, Devils Canyon, Rosita Area, Bonita Creek, Chicken Creek, and Coetas Creek. Hunting season begins September 1 and continues through May 10 each year. Texas state seasons and bag limits are enforced during this period for wild turkey (*Meleagris gallopavo*), mule and white tailed deer (*Odocoileus hemionus*, *Odocoileus virginianus*), bobwhite and scaled quail (*Colinus virginianus*, *Callipepla squamata*), mourning dove (*Zenaida macroura*), as well as a variety of ducks and geese. Hunting is permitted for designated game species only (with the exception of coyotes, rabbits, and raccoons). Pronghorn antelope (*Antilocapra americana*) may occasionally stray into the area, but they are primarily found in the flatter topography in upland prairies away from the Canadian River. Hunting areas are not closed to the general public during hunting season.

### 3.5.2. Impacts of Alternative A, No Action, on Wildlife

**Analysis.** Under Alternative A, No Action, the wells would not be reentered and the new well would not be drilled, resulting in no new impacts on fish and wildlife. However, during the continuing operation and maintenance of the 45 existing natural gas wells and their associated pipelines and access roads under Pioneer's ratified Plan of Operation, there is a remote possibility for the incidental take of wildlife during the course of operations and maintenance from vehicle use, or from wildlife ingesting leaked or spilled hydrocarbons and contaminating or hazardous substances.

Existing operation and maintenance of well pads, access roads, drip stations and pipelines under Pioneer's ratified Plan of Operation would be subject to 9B regulations; therefore, mitigation measures would be applied and impacts would be avoided or minimized to acceptable levels. However, operations and maintenance would not meet the requirements specified in the Final Oil and Gas Management Plan (April 2002) goal to establish native vegetation cover to 70%, ensuring the long-term revegetation success of the operations areas, and provide better assurance that habitat would be recovered. The measures that are applied, in addition to Pioneer's existing performance bond, would ensure rapid response in the event of a leak or spill, thereby providing better assurance that adverse impacts on fish and wildlife would be minimized, resulting in localized, short to long-term, minor, direct and indirect, adverse impacts on fish and wildlife localized around oil and gas operations.

**Cumulative Impacts.** Under Alternative A, No Action, cumulative impacts on fish and wildlife throughout the park could result from the continuing operation of nonfederal oil and gas operations, park developments, future drilling and production of up to 85 wells projected in the park's reasonably foreseeable development scenario on up to 150 acres. Existing surface disturbances located throughout the park, in combination with other park developments and activities, including park roads, visitor use areas, recreational activities, hunting, and prescribed fire management practices, have changed or reduced the amount of habitat available for use by fish and wildlife. However, since the establishment of the park, development decisions have been applied under a well-defined regulatory process that has limited any additional potential impacts on fish and wildlife.

It is possible that some past developments altered habitat utilized by fish and wildlife. Past impacts have included direct loss of terrestrial habitat at various sites. Also, the construction of roads, flowlines, and pipelines that cross the lake and its tributaries, or other areas developed near the lake and its tributaries, increased erosion and sedimentation that adversely affected water quality and aquatic habitats, particularly during construction activities. These combined effects have caused long-term impacts on vegetation, fish, and wildlife in and around the parks, resulting in removal of vegetation or a change (decrease) in site productivity and habitat value. These adverse impacts would remain until disturbed areas are reclaimed.

Existing and future construction and operations would be required to meet Current Legal and Policy Requirements, particularly compliance with the Endangered Species Act. If proposed operations have the potential to impact any fish and wildlife species and/or its habitat, the NPS consults with the U.S. Fish and Wildlife Service and Texas Parks and Wildlife Department on a project-by-project basis and develops measures to avoid impacting fish and wildlife.

Reclamation of disturbed areas in the park must reestablish natural topographic contours and native vegetative communities, and provide for the safe movement of native wildlife and the normal flow of surface waters. Wherever possible, habitats would be improved to perpetuate their viability and increase the survivability of fish and wildlife. Any adverse impacts on protected plants, fish, and wildlife habitat resulting from reclamation operations would add to the existing adverse impacts on fish and wildlife and their habitat within and adjacent to the park.

In combination with human-induced activities, including the park's prescribed fire management program, recreational uses, and nonfederal oil and gas operations, natural events such as fire, flood, and drought would also contribute to cumulative adverse effects on fish and wildlife. These cumulative effects cause stress that reduces the resiliency of the local populations.

Overall the effects described above would have cumulative, short to long-term, negligible to minor, direct and indirect, adverse impacts on fish and wildlife localized near developments and activities throughout the park.

**Conclusion.** Under Alternative A, No Action, the 22 wells would not be re-entered and the new well would not be drilled, resulting in no new impacts on fish and wildlife. However, current operations and maintenance of Pioneer's 45 existing wells and associated pipelines and access roads would continue under their existing ratified Plan of Operations, resulting in localized, short to long-term, negligible to minor, direct and indirect, adverse impacts on wildlife. Cumulative impacts from existing and future oil and gas operations in the park, park developments and operations, and visitor uses are expected to result in short to long-term, negligible to minor, direct and indirect, adverse impacts, localized near developments throughout the park. No impairment to fish and wildlife would result from implementation of this alternative.

### 3.5.3. Impacts of Alternative B, Proposed Action on Wildlife

**Analysis.** Under Alternative B, Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and in addition would re-enter 22 of these gas wells and drill 1 new well. Construction and maintenance of the well pad areas and pipeline would result in the direct loss of approximately 9 acres of various types of wildlife habitat. Displaced wildlife could potentially die of natural causes or displace other wildlife. There is a remote possibility for the incidental take of wildlife during the course of operations from vehicle use, construction activities, or from ingesting leaked or spilled hydrocarbons and contaminating or hazardous substances. Elevated noise levels, particularly during drilling operations, could displace wildlife, but most wildlife are expected to return after becoming acclimated to some noise disturbances. However, the application of mitigation measures, including fencing the operations area to exclude wildlife, using secondary containment to prevent leaks and spills of hydrocarbons and contaminating or hazardous substances from being released into the environment, covering all open-topped tanks to minimize accidental injury or death of birds, preventing the introduction of exotic plant species, careful use of NPS-approved herbicides, and routine monitoring and inspection of the operations are expected to substantially reduce the impacts to wildlife. Under Alternative B, the addition of a mitigation measure to adhere to the NPS's Oil and Gas Management Plan to establish native vegetation to 70%, would ensure the long-term revegetation success of the operations areas, and provide better assurance that habitat would be recovered. These measures, in addition to Pioneer's existing performance bond, would ensure rapid response in the event of a leak or spill, thereby providing better assurance that adverse impacts on wildlife would be minimized. With mitigation, continue operation of 45 existing gas wells and their associated pipelines and access roads; and in addition would re-enter 22 of these gas wells and drill 1 new well, would result in localized, short to long-term, negligible to minor direct and indirect adverse impacts on wildlife.

**Cumulative Impacts.** Under Alternative B, cumulative impacts on wildlife would be similar to those discussed for Alternative A, but with an increase of surface disturbance of 9 acres and added protection of mitigations measures, resulting in short- to long-term, negligible to minor, adverse impacts on fish and wildlife in the region around park or oil and gas developments.

**Conclusion.** Under Alternative B, continuing operation of 45 gas wells, re-entering 22 existing wells, drilling one new well, and their associated pipelines and access roads would result in localized, short- to long-term, negligible to minor adverse impacts on wildlife. Cumulative impacts would be similar to those described under Alternative A; No Action, but with an increase of surface disturbance of 9 acres and added protection of mitigation measures resulting in short to long-term, negligible to minor, direct and indirect, adverse impacts, localized around park and oil and gas developments. No impairment to wildlife or their habitat would result from implementation of this alternative.

## 3.6. VISITOR USE AND EXPERIENCE

### Methodology

Visitor surveys and personal observations of visitation patterns combined with an assessment of what is available to visitors under current management were used to estimate the effects of the actions in the alternatives. The impact intensity threshold used were:

**Negligible:** The impact is barely detectable, and/or will affect few visitors.

**Minor:** The impact is slightly detectable, and/or will affect few visitors.

**Moderate:** The impact is readily apparent and/or will affect some visitors.

**Major:** The impact is severely adverse or exceptionally beneficial and/or will affect many visitors.

### 3.6.1. Affected Environment

Lake Meredith is a water supply reservoir for 11 cities and provides the major resource in the panhandle region for water-based recreation, including sailing, boating, fishing, and swimming. Other recreational activities include picnicking, hiking, off-road vehicle (ORV) use, and hunting.

Three information stations, 1 developed trail, 16 day and overnight use areas, 2 ORV use areas, and 53 miles of park-maintained dirt and paved roadways provide recreational opportunities for approximately 1.0 million annual visitors to Lake Meredith National Recreation Area. Visitor use patterns are generally marked by weekend use in the spring, when visitors from the region go fishing, boating, horseback riding, bird watching, and four-wheeling. In the summer, lake use increases dramatically by boaters and campers. Users are families from the four-state region who come for weekly periods. In the fall, use of the lake diminishes slightly, with fishing becoming a primary use once again, while various seasons open for hunting. Winter use of the lake is light, consisting of regional visitors. During hunting season, visitor uses, such as hiking, off-road bicycling and horseback riding, are limited due to safety issues and concerns.

### 3.6.2. Impacts of Alternative A, No Action, on Visitor Use and Experience

**Analysis.** Under Alternative A, No Action, Pioneer would continue to operate and maintain the 45 existing gas wells and their associated pipelines and access roads; 22 of these gas wells would not be re-entered, and no additional wells would be drilled, resulting in no new impacts to visitor use and experience. However, impacts on visitor use and experience would continue as the result of vehicle use along the existing access routes during continued operation and maintenance of the wells and access roads. During all phases of operations, spilled hydrocarbons and contaminating or hazardous substances could pose a health and safety hazard to park visitors. However, the application of mitigation measures to prevent leaks and spills of hydrocarbons and contaminating or hazardous substances from being released into the environment; to prevent the introduction of exotic plant species; and to routinely monitor and inspect the operations are expected to substantially reduce the impacts on visitor use and experience to localized, long-term, negligible to minor adverse impacts.

**Cumulative Impacts.** Under Alternative A, No Action, cumulative impacts on visitor use and experience throughout the park could result from the visual impact of human developments on the natural scenery associated with the continuing operation of the existing nonfederal oil and gas operations within the park, park developments, and future drilling and production of up to 85 wells projected in the park's reasonably foreseeable development scenario on up to 150 acres. Other park activities that could contribute to impacts include prescribed fires, routine maintenance of park roads, and park and visitor vehicle use.

Cumulative impacts on visitor use and experience would result from human developments on the natural scenery from existing oil and gas wells, production facilities, and pipelines; future exploration and development of wells projected under the NPS's RFD scenario; and existing park developments. Most park developments provide essential support services and facilities for visitor use, resource interpretation, and education. Some park and oil and gas operations would cause elevated noise levels and odors. Human health and safety hazards include the potential for visitors

to come into contact with leaked and spilled hydrocarbon and contaminating or hazardous substances at oil and gas operations. With the application of mitigation measures detailed in the park's Oil and Gas Management Plan (April 2002), and incorporated into operators' Plans of Operations, impacts would be avoided or minimized. Cumulative impacts from the continued operation and maintenance of the 45 wells and access roads, plus the other actions in the park, would be localized, negligible to minor, and short-term.

**Conclusion.** Pioneer would not re-enter 22 of the existing gas wells, nor drill 1 new vertical well; therefore, there would be no new impacts on visitor use and experience associated with these activities. Existing impacts on visitor use and experience would result from operation and maintenance of the 45 existing wells, associated pipelines, and lease roads, resulting in localized, short-term to long-term, negligible to minor, adverse impacts on visitor use and experience.

Cumulative impacts from existing and future oil and gas operations in the park, park developments and operations, and visitor uses are expected to result in localized, short- to long-term, negligible to minor adverse impacts.

No impairment to visitor use and experience would result from implementation of this alternative.

### **3.6.3. Impacts of Alternative B, Proposed Action, on Visitor Use and Experience**

**Analysis.** To some visitors, the sight of oil and gas operations in a park is upsetting; while to others, it is viewed as a sign of economic prosperity. Under Alternative B, construction, operation and maintenance of the access roads, and well/production pads and pipelines would continue on 110.27 acres. Re-entry into 22 wells and drilling 1 new well would result in the direct loss of 9 additional acres of the park from visitor use during the life of the wells, for 10 to 25 years. During the drilling phase, transporting the drill rig and associated drilling equipment to and from the proposed well pads could cause deeper rutting on some of the existing dirt access roads. Standard Operating Procedures for the construction and maintenance of oil and gas access roads in the park (NPS 2002) would help ensure that proper maintenance of the oil and gas access roads would occur. Drilling would elevate noise levels; however, the construction and drilling phases would be short term, lasting approximately 60 days per location.

The natural gas wells are located throughout all areas of the park, within the viewshed from the Big Blue Creek ORV Use Area. The Masterson A-9 well is located within the Blue West Visitor Use Area, which provides a panoramic view of the lake, deep-water launching ramp, courtesy dock, and picnic areas. The drilling and completion of the well pre-dated the development of the Blue West Visitor Use Area. Bivins A-53, Bivins A-166, Masterson B-26, Masterson B-31, Masterson B-80, and Sneed E-1 wells are located in hunting areas. Scheduling of construction and re-entry of these wells would be scheduled with the park so that drilling of these wells would not likely interfere with hunting season or other visitor use enjoyment. As shown in Table 3 of the Plan of Operations, the wells would be drilled year-round.

During construction activities, it is likely that the only road that would be closed is during the construction and drilling of Masterson A-53. As previously discussed, the entire construction phase would last only one week per location and would not likely occur on a major holiday weekend. No additional impacts to visitor use and experience would occur during well pad construction or during continued operations and maintenance.

While the Masterson A-9 well is located within the Blue West Visitor Use Area and is obviously visible to park visitors, the visual intrusion on the natural scene is minimal because of the small-scale equipment associated with natural gas wells. The wellheads are painted tan and the meter houses

and fencing are a gray color —colors compatible with the park setting. The wellheads and facilities are fenced and gated, preventing intentional access into the operations area, thereby reducing the potential for human health and safety hazards.

During all phases of operations, spilled hydrocarbons and contaminating or hazardous would pose a health and safety hazard to park visitors. However, the application of mitigation measures, including fencing and signing the operations area to exclude visitors; using primary and secondary containment to prevent leaks and spills of hydrocarbons and contaminating or hazardous substances from being released into the environment; reclaiming the area around the well pad; preventing the introduction of exotic plant species; and routinely monitoring and inspecting the operations are expected to substantially reduce the impacts on visitor use and experience to localized, long-term, negligible to minor adverse impacts.

**Cumulative Impacts.** Cumulative impacts would be similar as those discussed under Alternative A, No Action, but with an increase of surface disturbance of 9 acres and added protection of mitigation measures, resulting in short-to long-term negligible to minor adverse impacts on visitor use and experience, localized around existing and future developments throughout the park.

**Conclusion.** Under Alternative B, Pioneer would continue operation of 45 existing gas wells and their associated pipelines and access roads; and in addition, would re-enter 22 of these gas wells and drill 1 new vertical well, requiring construction of the well/production pads, drilling and production of the well, as well as operation and maintenance of the access road. These activities would result in localized, short-term to long-term, negligible to minor, adverse impacts on visitor use and experience.

Cumulative impacts would be similar as those discussed under Alternative A, No Action, with an increase of surface disturbance of 9 acres and added protection of mitigation measures, resulting in short-to long-term negligible to minor adverse impacts on visitor use and experience, localized around existing and future developments throughout the park.

Reclamation of the construction area would result in a minor to moderate beneficial impact on visitor use and experience.

No impairment to visitor use and experience would result from implementation of this alternative.

## 4.0 CONSULTATION AND COORDINATION

### 4.1. AGENCIES/TRIBES/ORGANIZATIONS/INDIVIDUALS CONSULTED

The federal, state, and local agencies and private organizations/agencies and tribes that were contacted during the course of preparing this Environmental Assessment that assisted in identifying important issues, developing alternatives, or analyzing impacts are listed below:

U.S. Fish and Wildlife, lists of threatened and endangered species at website:  
<http://www.endangered.fws.gov/>

U.S. Fish & Wildlife Service, Ecological Services, Arlington, Texas  
Texas Parks and Wildlife Department, lists of rare species at website: [www.tpwd.state.tx.us](http://www.tpwd.state.tx.us)  
Texas Parks & Wildlife Department, Threatened & Endangered Species Division  
Texas State Historic Preservation Office (SHPO)  
Paul Eubank, Environmental Protection Specialist, Lake Meredith National Recreation Area  
Jim Rancier, Chief, Resources Management, Lake Meredith National Recreation Area  
Linda Dansby, Intermountain Regional Minerals Coordinator, Santa Fe, New Mexico  
Cheryl Eckhardt, NEPA /106 Specialist, Intermountain Regional Office, Denver, Colorado

#### **Culturally Affiliated Indian Tribes**

Apache Tribe of Oklahoma, OK  
Caddo Tribe, OK  
Cheyenne-Arapaho Tribe, OK  
Comanche Tribe, OK  
Delaware Nation of Oklahoma, OK  
Fort Sill Apache Tribe, OK  
Jicarilla Apache Tribe, NM  
Kiowa Tribe, OK  
Mescalero Apache Tribe, NM  
Wichita and Affiliated Tribes, OK

### 4.2. PREPARERS

The following is a list of preparers and contributors that helped in the preparation of this EA.

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Terri West	Executive Summary, Section 1, Section 2, Section 3, Section 4, and Project Management	Sr. Project Manager	URS Corporation, Dallas, Texas

### 4.3. LIST OF RECIPIENTS

A notice of availability of the Plan of Operations and Environmental Assessment will be published in the *Federal Register*, and in the local newspaper. The 30-day public review period will begin on the date the notice of availability is published in the *Federal Register*.

Following the 30-day public review period, NPS will consider written comments received. Additional mitigation measures resulting from the public involvement process may result in additional measures being applied as conditions of approval. Additional mitigation measures will be identified in the decision document. Copies of the decision document will be sent to those who comment on the Plan of Operations, Environmental Assessment, and Statement of Findings during the public review period, or request a copy.

Copies of the EA, Plan of Operations, and draft Floodplains Statement of Findings will be sent to:

#### **Stakeholder**

Canadian River Municipal Water Authority

#### **Agencies**

National Park Service:

Intermountain Regional Office Minerals Coordinator

Intermountain Regional Office NEPA/106 Specialist

Bureau of Reclamation

U.S. Environmental Protection Agency

Federal Emergency Management Agency, Region VI, Regional Director

U.S. Fish and Wildlife Service

U.S. Geological Survey

U.S. Army Corps of Engineers

Natural Resource Conservation Service

Texas State Historic Preservation Office

Office of the Governor (State Clearinghouse) Austin, Texas

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# **APPENDIX A    EMERGENCY FLOOD PROCEDURES**

Emergency Flood Procedures  
By  
Pioneer Natural Resources USA, INC.  
To  
Wells Located  
Within the  
Lake Meredith National Recreation Area,  
Potter, Moore, and Hutchinson County, Texas

November 2003

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### **Tables**

Table 1      Well Elevations

Table 2      Contact Information List

## **APPENDICES**

Appendix A   Topographic Maps

## Section I

I. Floodplains are defined as lowland relatively flat areas adjoining inland and coastal waters. The 100-year floodplain is an area that is subject to a 1.0 percent or greater chance of flooding in any given year. Within the boundaries of Lake Meredith National Recreation Area, only the estimated 100-year floodplains for Potter and Hutchinson Counties have been mapped by the Federal Emergency Management Agency (FEMA) on Flood Insurance Rate Maps (FIRM).

Protection of floodplains is provided for in the NPS Floodplain Management Guidelines, Special Directive 93-4, which requires the NPS recognize and manage for the preservation of floodplain values, in order to minimize potentially hazardous conditions associated with flooding, and to adhere to all federally mandated laws and regulations pertaining to the management of activities in flood-prone areas.

According to the Final Oil and Gas Management Plan December 2002) approximately 42% of the park is located in the 500-year flood plain, 10% of the park is located between the estimated 100 and estimated 500-year floodplain elevations and approximately 41% of the is located below the estimated 100-year flood elevation.

Based on field observations, topographic surveys, and review of the parks Final Oil and Gas Management Plan EIS, the following existing wells Masterson B-13, Masterson B-23, Masterson B-26 and Masterson B-25 are located within the estimated 100-year floodplain (below 2948'). These wells all have a cover on their drip stations to prevent spills of hydrocarbons and brine that collects in the drips.

Table 1: WELL ELEVATIONS

100 Year Flood Plain Elevation 2948' and Below

Masterson B13	2942 ft.
Masterson B25	2939 ft.
Masterson B23	2937 ft.
Masterson B26	2942 ft.

## I. MAP

### A. Well Location Maps

Refer to the Plan of Operations, Appendix B for topographic maps of the area. Marked on the maps are the following:

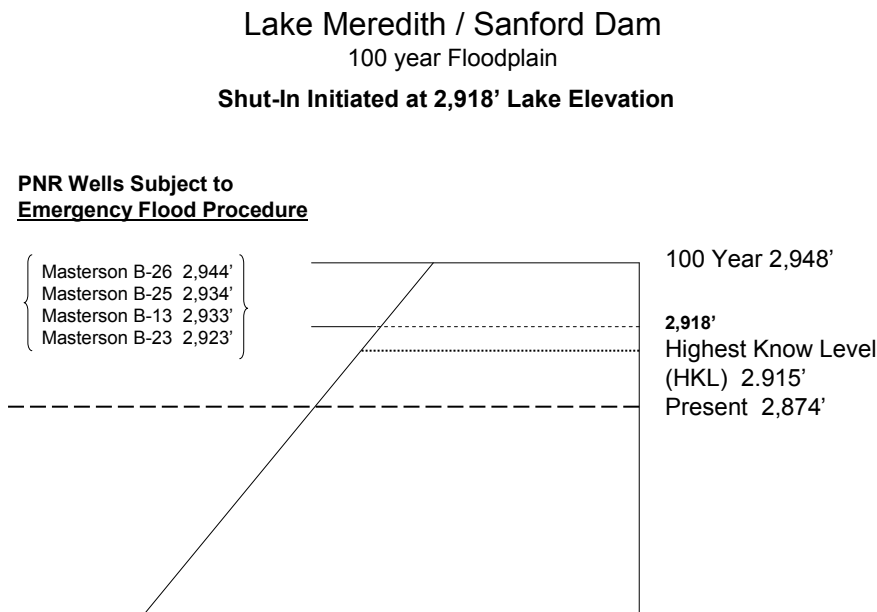
1. The locations of the wells as referred to in Table 1 with existing access routes
2. Wells subject to the Emergency Flood Procedure are marked in red.

## Section II

### II. DESCRIPTION OF OPERATIONS

In the event that the National Park Service (NPS) reports that reservoir water levels have reached or exceeded the Highest Known Level (HKL), Pioneer Natural Resources (PNR) will initiate item A) of the Emergency Flood Procedure as described below. Please see **Figure 1** below for information concerning the HKL.

**FIGURE 1**



#### A. Notification & Monitoring

Notification of such action will be made by the designated Area Foreman to the appropriate pumper(s). The Area Foreman will monitor lake levels via the NPS web site. Notification will also be given to the NPS and PNR headquarters in Irving, Texas as soon as possible after it has been reported that the reservoir level has reached HKL.

#### B. Initiation of Shut-In

Once recorded lake levels reach 2,918', the designated area foreman will insure that the appropriate wells, as listed in Table 1 that fall within the 100 Year Flood Plain, will be shut-in (as described in Section C.). If however, lake levels subsequently fall below 2,918', said wells will be returned to production.

### **C. Shut-In Procedures**

Close orbit valve. To insure proper operation of valve, an annual inspection will be performed under the supervision of the area foreman. Said foreman will maintain records of the above mentioned inspections at the PNR Fritch Field Office located one mile west and ¼ mile north on Pioneer Road.

### **D. Responsible Parties**

The persons responsible for the shut-in procedure and those responsible for making notifications, as well as those who are to receive notification, along with appropriate contact information are shown in Table 2 below.

**Table 2-Contact Information List**

Area Foreman (Fritch)	(806) 857-3133	Glen Paris
Area Foreman (Masterson)	(806) 934-1295	Craig Brooks
PNR HES Manager	(972) 444-9001	Wilbur Dover
PNR Operations Manager	(972) 444-9001	Dale Bankhead
NPS Environmental Specialist	(806) 865-3874	Paul Eubank

### **III. TIMETABLE FOR OPERATIONS**

It is imperative that reservoir levels be updated regularly. Therefore the PNR Area Foreman will consult the NPS posted web site on a monthly basis and levels will be maintained in the PNR Fritch office. In the event HKL is reached and weather reports indicate excessive rainfall events, the PNR Area Foreman will monitor lake levels on a daily basis.

# APPENDIX B

# PLANT SPECIES

## Major Plant Species within the Proposed Project Areas

Common Name	Scientific Name	Well Name
Annual Broomweed	<i>(Amphiachyris dracunculoides)</i>	Bivins A-53, Bivins A-136, Bivins A-206, Bivins A-208, Fee A-2, Masterson A-9, Masterson B-29, Masterson B-31, Masterson B-51, Masterson B-73, Masterson B-80
Annual Wild Buckwheat	<i>(Eriogonum annuum)</i>	Bivins A-29, Bivins A-46, Bivins A-49, Bivins A-53, Bivins A-136, Bivins A-165, Bivins A-166, Bivins A-208, Bivins H-2, Masterson A-9, Masterson B-11, Masterson B-13, Masterson B-29, Masterson B-31, Masterson B-51, Masterson B-73
Annual Sunflower	<i>(Helianthus annuus)</i>	Bivins A-46, Masterson B-13
Basket Flower	<i>(Centaurea americana)</i>	Bivins A-46, Bivins A-53, Bivins A-165, Bivins A-206, Bivins A-208, Bivins H-2, Fee A-2, Masterson B-3, Masterson B-11, Masterson B-13, Masterson B-29, Masterson B-73, Masterson B-93, Sneed E-1
Beggars Ticks	<i>(Bidens cernua)</i>	Masterson A-9
Big Bluestem	<i>(Andropogon gerardii vitman)</i>	Masterson B-13, Masterson B-73
Bigseed Chenopodium	<i>(Chenopodium gigantospermum)</i>	Bivins A-46, Masterson B-11, Masterson B-13, Masterson B-23, Masterson B-25, Masterson B-26, Masterson B-29, Masterson B-31, Masterson B-73
Bigtop Dalea	<i>(Dalea enneandra)</i>	Masterson B-73
Bitterweed	<i>(Hymenoxys scaposa)</i>	Bivins A-165, Bivins A-206, Masterson B-3, Masterson B-11, Masterson B-93
Blackfoot Daisy	<i>(Melampodium leucanthemum)</i>	Bivins A-166, Bivins A-206, Bivins H-2
Black Grama	<i>(Bouteloua eriopoda)</i>	Masterson B-31
Bladderpod	<i>(Lesquerella gordonii)</i>	Bivins H-2
Blue Grama	<i>(Bouteloua gracilis)</i>	Bivins A-29, Bivins A-46, Bivins A-49, Bivins A-53, Bivins A-136, Bivins A-166, Bivins A-206, Bivins H-2, Masterson B-3, Masterson B-11, Masterson B-13, Masterson B-31, Masterson B-93
Bristlegrass	<i>(Setaria macrostachya)</i>	Masterson B-25
Buffalo Bur (Bull Nettle)	<i>(Solanum rostratum)</i>	Bivins A-29, Bivins H-2, Masterson A-9
Buffalo Grass	<i>(Stenotaphrum secundatum)</i>	Masterson B-11
Bull Thistle	<i>(Cirsium undulatum)</i>	Bivins A-29, Bivins A-136, Bivins A-165, Masterson B-11, Masterson B-73
Canada Wildrye	<i>(Elymus canadensis)</i>	Bivins A-46, Bivins A-136, Masterson B-13, Masterson B-73
Catclaw Mimosa	<i>(Mimosa biuncifera)</i>	Bivins A-29, Bivins A-53, Bivins A-165, Bivins A-206, Bivins H-2, Masterson B-11, Masterson B-80, Masterson B-93, Sneed E-1
Christmas Cactus	<i>(Opuntia ramosissimum)</i>	Masterson B-3, Masterson B-11
Clammyweed	<i>(Polanisia dodecandra)</i>	Sneed E-1
Colorado Greenthread	<i>(Thelesperma megapotamicum)</i>	Fee A-2, Masterson B-93
Cottonwood	<i>(Populus sargentii)</i>	Bivins A-46, Bivins A-136
Daisy Fleabane	<i>(Erigeron divergens)</i>	Bivins A-46, Bivins A-53, Masterson A-9, Masterson B-23, Masterson B-26, Masterson B-31, Masterson B-73
Devil's Claw	<i>(Proboscidea louisianica)</i>	Masterson B-25

Common Name	Scientific Name	Well Name
Euphorbia	( <i>Euphorbia spp.</i> )	Bivins H-2, Fee A-2
Fall Witch Grass	( <i>Leptoloma cognatum</i> )	Bivins A-49, Masterson B-29, Masterson B-31, Masterson B-51
Feather Dalea	( <i>Dalea formosa</i> )	Bivins A-29, Masterson B-80, Masterson B-93
Four-wing Saltbush	( <i>Atriplex canescens</i> )	Bivins A-206, Masterson B-93
Gay Feather	( <i>Liatris punctata</i> )	Bivins A-29, Bivins A-165, Masterson B-80, Masterson B-93
Gray Sage	( <i>Artemisia frigida</i> )	Bivins A-29, Bivins A-53, Bivins A-136, Bivins H-2, Fee A-2, Masterson B-13, Sneed E-1
Green Thread	( <i>Thelesperma filifolium</i> )	Masterson B-3
Hackberry	( <i>Celtis reticulata</i> )	Bivins A-46, Bivins A-136, Bivins A-166, Masterson B-23, Masterson B-29, Masterson B-31
Hairleaf Sand Sage	( <i>Artemisia filifolia</i> )	Bivins A-46, Bivins A-49, Bivins A-136, Bivins A-206, Bivins A-208, Masterson A-9, Sneed E-1
hairy Grama	( <i>Bouteloua hirsuta</i> )	Bivins A-29, Bivins A-165, Bivins A-166, Bivins A-208, Masterson B-73
Hall's Panicum	( <i>Panicum hallii</i> )	Masterson B-25
Heath Aster	( <i>Aster ericoides</i> )	Bivins A-29, Masterson B-13, Masterson B-26, Masterson B-73, Masterson B-93
Hopseed Bush (Wafer Ash)	( <i>Ptelea americana</i> )	Fee A-2
Horse Mint	( <i>Monarda punctata</i> )	Bivins A-46, Masterson A-9, Masterson B-25, Masterson B-51, Masterson B-73
Horsetail Weed	( <i>Conyza canadensis</i> )	Bivins A-29, Bivins A-53
Indian Blanket	( <i>Gaillardia pulchella</i> )	Bivins A-46, Bivins A-166, Bivins A-206, Bivins A-208, Masterson A-9, Masterson B-13, Masterson B-31, Masterson B-51, Masterson B-73, Sneed E-1
Japanese Brome (Cheatgrass)	( <i>Bromus japonicus</i> )	Masterson A-9
Kochia(Summer Cypress)	( <i>Kochia scoparia</i> )	Bivins A-53, Bivins H-2, Masterson B-23, Masterson B-26, Masterson B-29, Masterson B-31
Lace Cactus	( <i>Echinocereus caespitosus</i> )	Masterson B-51, Masterson B-73, Sneed E-1
Little Bluestem	( <i>Schizachyrium scoparium</i> )	Bivins A-29, Bivins A-49, Bivins A-136, Bivins A-166, Fee A-2, Masterson B-13, Masterson B-29, Masterson B-73, Masterson B-80, Masterson B-93
Lizard's Tail	( <i>Gaura parviflora</i> )	Bivins A-49, Bivins A-136, Masterson B-80
Mesquite	( <i>Bouteloua oligostachya</i> )	Bivins A-46, Bivins A-53, Bivins A-136, Bivins A-165, Bivins A-166, Bivins A-206, Bivins A-208, Bivins H-2, Fee A-2, Masterson A-9, Masterson B-3, Masterson B-11, Masterson B-13, Masterson B-23, Masterson B-25, Masterson B-26, Masterson B-29, Masterson B-31, Masterson B-51, Masterson B-73, Masterson B-93, Sneed E-1
Milkweed	( <i>Asclepias spp.</i> )	Bivins A-29, Bivins A-165
Nailwort	( <i>Paronychia jamesii</i> )	Bivins A-29, Bivins A-165
Narrow-leaved Globe Mallow	( <i>Sphaeralcea angustifolia</i> )	Fee A-2, Masterson A-9, Masterson B-31
Navajo Tea (Colorado Greenthread)	( <i>Thelesperma megapotamicum</i> )	Bivins A-49, Bivins A-165, Bivins A-166, Masterson B-11, Masterson B-73, Sneed E-1
Old Plainsman	( <i>Hymenopappus scabiosaeus</i> )	Bivins H-2
One-seed Juniper	( <i>Juniperus monosperma</i> )	Bivins A-136, Masterson A-9, Masterson B-31, Masterson B-80
Paperflower	( <i>Zinnia grandiflora</i> )	Fee A-2

Common Name	Scientific Name	Well Name
Perennial Broomweed	<i>(Gutierrezia sarothrae)</i>	Bivins A-29, Bivins A-46, Bivins A-49, Bivins A-53, Bivins A-136, Bivins A-166, Bivins A-208, Bivins H-2, Fee A-2, Masterson A-9, Masterson B-3, Masterson B-11, Masterson B-13, Masterson B-29, Masterson B-51, Masterson B-73, Masterson B-80, Masterson B-93, Sneed E-1
Plains Bristlegrass	<i>(Setaria macrostacya)</i>	Bivins A-208, Bivins H-2, Fee A-2, Masterson A-9, Masterson B-11, Masterson B-23, Masterson B-26, Masterson B-29, Masterson B-31, Sneed E-1
Plains Prickly Pear	<i>(Opuntia spp.)</i>	Bivins A-29, Bivins A-136, Bivins A-166, Bivins A-206, Bivins H-2, Fee A-2, Masterson B-3, Masterson B-11, Masterson B-31, Sneed E-1
Prairie Coneflower	<i>(Echinacea angustifolia)</i>	Fee A-2, Masterson B-11
Prairie Sunflower ( <i>Plains Sunflower</i> )	<i>(Helianthus petiolaris)</i>	Masterson B-25
Prairie Turnip	<i>(Psoralea angustifolia)</i>	Masterson B-73, Masterson B-93, Sneed E-1
Prickleleaf Gilia	<i>(Gilia rigidula)</i>	Bivins A-29
Purple Penstemon	<i>(Penstemon fendleri)</i>	Masterson B-73
Ragweed	<i>(Ambrosia psilostachya)</i>	Bivins A-46, Bivins A-49, Bivins A-53, Bivins A-136, Bivins A-166, Bivins A-208, Fee A-2, Masterson A-9, Masterson B-11, Masterson B-13, Masterson B-29, Masterson B-31, Masterson B-51, Masterson B-73, Masterson B-80, Sneed E-1
Rubber Rabbit Brush	<i>(Chrysothamnus nauseosus)</i>	Bivins A-166
Russian Thistle (Tumbleweed)	<i>(Salsola iberica)</i>	Bivins A-46, Bivins A-136, Bivins A-206, Bivins H-2, Masterson A-9, Masterson B-3, Masterson B-13, Masterson B-23, Masterson B-25, Masterson B-31, Masterson B-51
Sand Dropseed	<i>(Sporobolus cryptandra)</i>	Bivins A-46, Bivins A-49, Bivins A-53, Bivins A-136, Bivins A-165, Bivins A-166, Bivins A-206, Bivins A-208, Bivins H-2, Masterson A-9, Masterson B-11, Masterson B-13, Masterson B-23, Masterson B-29, Masterson B-51, Masterson B-73, Masterson B-80, Sneed E-1
Sand Sage	<i>(Artemisia filifolia)</i>	Masterson B-51
Sawleaf Daisy	<i>(Prionopsis ciliate)</i>	Bivins A-46, Bivins A-49, Bivins A-53, Bivins A-136, Bivins A-166, Bivins A-206, Bivins A-208, Masterson A-9, Masterson B-3, Masterson B-11, Masterson B-13, Masterson B-23, Masterson B-29, Masterson B-51, Masterson B-73, Masterson B-93, Sneed E-1
Scarlet Gaura (Wild Honeysuckle)	<i>(Gaura coccinea)</i>	Bivins A-49, Fee A-2
Scarlet Globemallow	<i>(Sphaeralcea coccinea)</i>	Fee A-2, Masterson B-31
Sideoats Grama	<i>(Bouteloua curtipendula)</i>	Bivins A-136, Masterson B-3, Masterson B-13, Masterson B-29, Masterson B-31, Masterson B-73, Masterson B-93
Silver Bluestem	<i>(Bothriochloa saccharoides)</i>	Bivins A-29, Bivins A-49, Bivins A-165, Bivins A-206, Fee A-2, Masterson B-3, Masterson B-11, Masterson B-13, Masterson B-51, Masterson B-73, Sneed E-1

Common Name	Scientific Name	Well Name
Silverleaf Nightshade	<i>(Solanum eleagnifolium)</i>	Bivins A-29, Bivins A-46, Bivins A-53, Bivins A-136, Bivins A-206, Bivins H-2, Masterson A-9, Masterson B-11, Masterson B-13, Masterson B-23, Masterson B-25, Masterson B-26, Masterson B-31, Masterson B-51, Masterson B-93
Skunkbush Sumac	<i>(Rhus aromatica)</i>	Bivins A-29, Bivins A-53, Bivins A-136, Masterson B-13
Slimleaf Goosefoot	<i>(Chenopodium leptophyllum)</i>	Masterson B-11, Sneed E-1
Slim Tridens	<i>(Tridens muticus)</i>	Bivins A-29, Bivins A-136, Bivins A-165, Bivins A-208, Fee A-2, Masterson B-11
Soapberry	<i>(Sapindus drummondii)</i>	Bivins A-46
Stereum Fungus	<i>(Stereum sp.)</i>	Bivins A-29, Masterson B-11
Stick Leaf	<i>(Mentzelia stricta)</i>	Bivins A-49, Bivins A-165, Bivins A-166, Bivins A-206, Bivins H-2, Fee A-2, Masterson A-9, Masterson B-3, Masterson B-31, Masterson B-51, Masterson B-73, Masterson B-80, Sneed E-1
Stickseed (Tickseed)	<i>(Lappula redowskii)</i>	Fee A-2, Masterson B-13
Sunflower	<i>(Helianthus annuus)</i>	Bivins A-29, Bivins A-206, Bivins A-208, Fee A-2, Masterson A-9, Masterson B-3, Masterson B-11, Masterson B-23, Masterson B-25, Masterson B-26, Masterson B-29, Masterson B-31, Masterson B-93
Switch Grass	<i>(Panicum virgatum)</i>	Bivins A-136
Tahoka Daisy (Tansy Aster)	<i>(Machaeranthera tanacetifolia)</i>	Bivins A-46, Bivins A-53, Bivins A-206, Bivins A-208, Fee A-2, Masterson B-11, Masterson B-93
Tall Annual Broomweed	<i>(Gutierrezia texana)</i>	Bivins A-165, Bivins A-208, Masterson B-11
Tall Gumweed	<i>(Grindelia squarrosa)</i>	Masterson B-73
Tall Milkweed	<i>(Asclepias verticellata)</i>	Masterson B-73
Tallowweed	<i>(Plantago patagonica)</i>	Bivins A-46, Sneed E-1
Tansy Mustard	<i>(Descurainia pinnata)</i>	Bivins H-2
Texas Croton	<i>(Croton texensis)</i>	Bivins A-29, Bivins A-53, Bivins A-136, Masterson B-31
Three Awn Grass	<i>(Aristida longiseta)</i>	Bivins A-29, Bivins A-46, Bivins A-49, Bivins A-165, Bivins A-166, Bivins A-206, Bivins H-2, Fee A-2, Masterson B-3, Masterson B-11, Masterson B-13, Masterson B-31, Masterson B-73, Masterson B-80, Masterson B-93, Sneed E-1
Tumble Windmill Grass	<i>(Chloris verticillata)</i>	Bivins A-166, Fee A-2
Vine Mesquite	<i>(Panicum obtusum)</i>	Bivins A-46, Bivins H-2, Masterson B-11, Masterson B-13, Masterson B-23, Masterson B-25, Masterson B-31, Masterson B-73, Masterson B-93
Walkingstick Cholla	<i>(Opuntia imbricate)</i>	Bivins A-136, Masterson B-11
Western Wheatgrass	<i>(Elytrigia smithii)</i>	Bivins A-46, Bivins A-136, Masterson A-9, Masterson B-11, Masterson B-13, Masterson B-23, Masterson B-25, Masterson B-26
White Aster	<i>(Aster ptarmicoides)</i>	Bivins H-2, Fee A-2
White Evening Primrose	<i>(Oenothera pallida)</i>	Bivins H-2
Wild Buckwheat	<i>(Polygonum convolvulus)</i>	Fee A-2
Wild Mercury	<i>(Argythamnia mercurialina)</i>	Bivins A-29
Wild Onion	<i>(Allium spp)</i>	Bivins H-2
Winged Wild Buckwheat	<i>(Eriogonum alatum)</i>	Masterson B-13
Winterfat	<i>(Ceratoides lanata)</i>	Bivins A-136, Masterson B-11, Masterson B-93
Woolly Paperflower	<i>(Psilostrophe tagetina)</i>	Bivins A-206, Bivins A-208, Masterson B-11

Common Name	Scientific Name	Well Name
Yellow Evening Primrose	<i>(Calylophus serrulatus)</i>	Fee A-2
Yellow Spiny Daisy	<i>(Machaeranthera pinnatifida)</i>	Bivins A-49, Fee A-2, Sneed E-1
Yucca	<i>(Yucca filamentosa)</i>	Bivins A-29, Bivins A-46, Bivins A-49, Bivins A-136, Bivins A-165, Bivins A-166, Bivins A-206, Bivins A-208, Bivins H-2, Fee A-2, Masterson A-9, Masterson B-3, Masterson B-11, Masterson B-13, Masterson B-29, Masterson B-31, Masterson B-51, Masterson B-73, Masterson B-80, Masterson B-93, Sneed E-1